

AD-A095 065

STEVENS INST OF TECH HOBOKEN NJ DAVIDSON LAB

P/O 13/16

EFFECT OF LOW FREEBOARD ON THE BEHAVIOR OF AN AMPHIBIOUS VEHICLE-ETC(U)

JAN 81 E NUMATA, M J CHIOCCO

NO0014-80-D-0890

UNCLASSIFIED

SIT-DL-81-9-2155

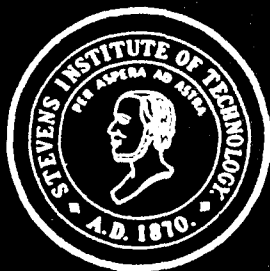
NL

1 OF 1
080085



END
DATE
FILMED
8-81
DTIC

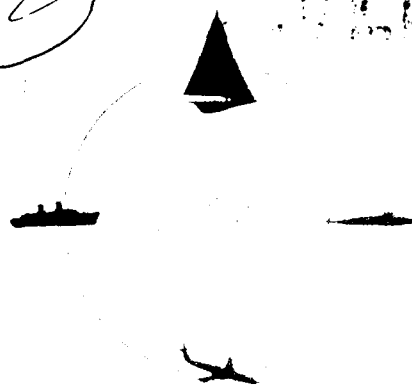
AD 313 313 313



STEVENS INSTITUTE
OF TECHNOLOGY

CASTLE POINT STATION
HOBOKEN, NEW JERSEY 07030

(12)



DAVIDSON LABORATORY

Technical Report SIT-DL-81-9-2155

January 1981

EFFECT OF LOW FREEBOARD ON THE
BEHAVIOR OF AN AMPHIBIOUS VEHICLE IN HEAD SEAS

by

E. Numata and M.J. Chiocco

APPROVED FOR PUBLIC RELEASE
DISTRIBUTION UNLIMITED

Prepared for
David W. Taylor Naval Ship R & D Center

under
Office of Naval Research
Contract N00014-80-D-0890
Project NR 062-069

17 1981

A 81 2 17 004

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER SIT-DL-81-9-2155	2. GOVT ACCESSION NO. AD-H095-065	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) EFFECT OF LOW FREEBOARD ON THE BEHAVIOR OF AN AMPHIBIOUS VEHICLE IN HEAD SEAS.		5. TYPE OF REPORT & PERIOD COVERED Final Report
7. AUTHOR(s) E. Numata and M. J. Chiocco		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS DAVIDSON LABORATORY Stevens Institute of Technology Hoboken, New Jersey 07030		8. CONTRACT OR GRANT NUMBER(s) N00014-80-D-0890 Project NR 002-119
11. CONTROLLING OFFICE NAME AND ADDRESS OFFICE OF NAVAL RESEARCH 800 N. Quincy Arlington, Virginia 22217		10. PROGRAM ELEMENT PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) DAVID W. TAYLOR NAVAL SHIP R & D CENTER Bethesda, Maryland 20084 Attn: Code 1120		12. REPORT DATE January 1981
		13. NUMBER OF PAGES 65
		15. SECURITY CLASS (of this report) Unclassified
16. DISTRIBUTION STATEMENT (of this Report) Approved for Public Release, Distribution Unlimited.		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Amphibious Freeboard Seakeeping		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report summarizes investigations of the effect of deck height, gross weight, and LCG position on an amphibious vehicle in head sea state 2.		

STEVENS INSTITUTE OF TECHNOLOGY

DAVIDSON LABORATORY
CASTLE POINT STATION
HOBOKEN, NEW JERSEY

Technical Report SIT-DL-81-9-2155

January 1981

EFFECT OF LOW FREEBOARD ON THE
BEHAVIOR OF AN AMPHIBIOUS VEHICLE IN HEAD SEAS

by

E. Numata and M.J. Chiocco

Prepared for

David W. Taylor Naval Ship R & D Center

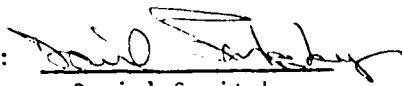
under

Office of Naval Research

Contract N00014-80-D-0890

Project NR 062-669

(Davidson Laboratory Project 4852/092)

Approved: 

Daniel Savitsky
Deputy Director



INTRODUCTION

The relatively low freeboard resulting from the low silhouette of the new generation of amphibious craft has raised questions relating to their waterborne performance. Existing configurations having greater freeboard have been speed-limited in smooth water when negative trim has caused bow swamping and loss of visibility. With decreased freeboard the attainable speed of the proposed vehicles may be reduced to an unacceptable level in smooth water and waves.

Under the guidance of Code 1120 of David W. Taylor Naval Ship R & D Center (DWTNSRDC), a model test program was initiated to study the behavior of a representative amphibious craft in an operational sea state. The following parameters were systematically varied to evaluate their effect on mean running freeboard, vertical acceleration and mean resistance as a function of vehicle speed in a head sea state 2.5:

- a. Vehicle gross weight,
- b. Vehicle LCG location,
- c. Height over troop compartment,
- d. Deflection angle of water jet propulsor thrust,

The general objective was to define the operating boundaries of the vehicle. Accordingly, the matrix of parameter variations was trimmed as necessary to eliminate any combination of load, CG deck height and speed which would be likely to result in unacceptable behavior.

MODEL

The configuration of a representative amphibious vehicle used for the model is shown in Figure 1 with prototype dimensions in inches.

A 1/8-scale model of the vehicle was constructed with a wood hull; plastic wheels, idlers and sprockets; and aluminum tracks. The designed height over the troop compartment of 72 in. was increased to 78 in. and 84 in. by inserting spacers between the lower hull portion and a removable deck and turret assembly, as shown in Figure 2.

Hydrostatic characteristics and loading data for the representative vehicle were as follows, where trim is referred to the baseline, Figure 1.

<u>Condition</u>	<u>LCG from bow, in.</u>	<u>Trim</u>
Combat loaded, no troops	155	by bow
Combat loaded, with troops	161	by stern

The shift in LCG between conditions was 6 in. over a vehicle length of 296 in. or 2 percent.

Code 1120 of DWTNSRDC suggested that gross weights of 42,000, 48,000 and 55,000 lb be used with three LCG positions, varying in increments of 6 in. (2 percent of length), for each gross weight. The 48,000 lb gross weight was close to the "with troops" loading of the representative vehicle and this load was assigned an LCG of 161 in. aft of the bow with a resulting trim by the stern; alternate LCG locations were at 155 in. and 167 in.

The 42,000 lb gross weight was assumed to represent a "no troops" loading with an LCG of 155 in. which produced trim by the bow; alternate LCG locations were 149 in. and 161 in.

Since the 55,000 lb "overload" condition had a minimal freeboard, a median LCG of 155 in. was chosen because it resulted in a near zero trim; alternate locations were 149 in. and 161 in.

LCG locations were also identified as a percentage of vehicle length L measured from the 155-inch location, as follows.

<u>In. from Bow</u>	<u>% of L</u>
149	2% Fwd
155	0%
161	2% Aft
167	4% Aft

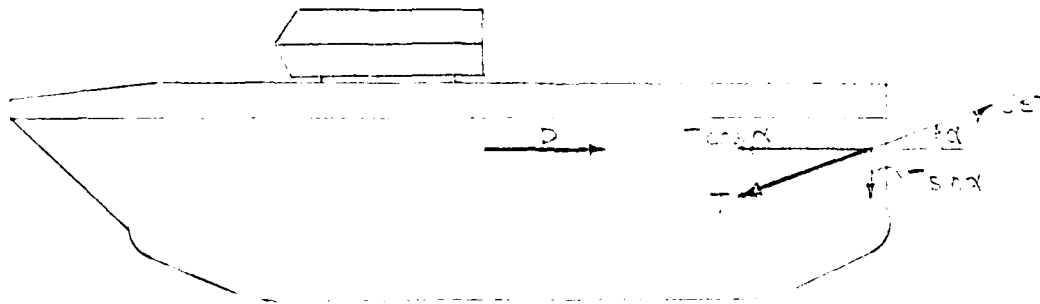
It was desired to evaluate the effect of vectoring the water jet propulsors to increase bow-up running trim. Since the water jets were not modeled, the following technique was employed to simulate jet vectoring.

With the water jet axis vectored α degrees upward, the longitudinal component of thrust $T \cos \alpha$ was assumed to equal the mean running drag D. The vertical component of thrust $T \sin \alpha$, which generates a bow-up trim moment, may be expressed in terms of D as follows:

$$T \cos \alpha = D \quad \text{or} \quad T = D / \cos \alpha$$

$$\text{Then } T \sin \alpha = D \sin \alpha / \cos \alpha = D \tan \alpha$$

Thus the vertical component of thrust was simulated by a weight at the transom equal to $D \tan \alpha$.



TEST INSTRUMENTATION AND PROCEDURE

The model was towed through a transverse pitch axis at the LCG, at a height of 48 inches above the baseline, equal to the height of the centerlines of the water jet propulsors. The frontispiece shows the model under tow in waves; the pitch axis pivots are below deck level and therefore not visible. The photo shows twin heave masts rolling on bearing wheels; the bearing wheels are mounted on a frame attached to the towing carriage. The lower ends of the heave masts are joined by a crossbar and a drag balance is attached to the underside of the bar; a tube connects the balance to the pitch pivot unit.

Linear and rotary transducers sensed vertical and angular displacements of the pitch axis. An inclinometer senses static trim angle. Vertical accelerations were sensed by an accelerometer located 161 inches aft of the bow. A wave elevation probe was suspended from a carriage ahead of the model.

Signals from the sensors were carried by cable to shore, passed through conditioners and recorded as time histories on chart paper and magnetic tape. The tank-side PDP-8e digital computer digitized the signals and performed statistical analyses of all the measured quantities at the end of each test run.

All tests were conducted in Tank 3 which is 313 ft x 10 ft x 5.4 ft in depth. The model was towed at constant speed into waves generated by a plunger-type wavemaker at the far end of the tank. Data were recorded over a distance of 140 ft corresponding to almost a quarter of a mile full-scale. The wavemaker control produced a reproducible sequence of 100 waves varying in length and height, and having an average of the third highest of 2.2 ft full-scale (Sea State 2). Numbers of waves encountered ranged from 70 at 4 mph to 40 at 8 mph.

All test runs were recorded on VHS-type videotape of model time scale.

• TEST RESULTS

Table 1, page 9, presents the matrix of test conditions and lists the corresponding run numbers; static trim angles are included.

Computer listings of statistical results are given on pages 20 through 65 in chronological order of run numbers; explanatory notes appear on page 25.

Following a review of preliminary test results, Code 1120 suggested that the measured statistics of pitch and heave motions be translated into equivalent freeboards (1) at the bow, (2) at the vehicle driver location 67 inches aft of the bow, and (3) at the transom. Each freeboard is a quasi-static quantity composed of the at-rest freeboard modified by the mean running heave and pitch measured in waves. A sample calculation is detailed in an Appendix, page 8.

Trends of running freeboard at the three locations versus vehicle speed, with LCG location as a parameter, are shown in Figures 3-13, pages 12 through 22.

<u>Figure</u>	<u>Gross Weight, lb.</u>	<u>Deck Height, in.</u>	<u>Water Jet Angle, deg.</u>
3	42,000	72	0
4	"	78	0
5	"	78	20
6	"	84	0
7	48,000	72	0
8	"	78	0
9	"	78	20
10	"	84	0
11	55,000	78	0
12	"	78	20
13	"	84	0

R-2155

Because of low freeboard, only one test condition was run at 72-inch deck height x 55,000 lb.

Figures 14 and 15 are charts of CG acceleration and mean drag, respectively, versus vehicle speed.

DISCUSSION OF RESULTS

Videotape records of the test runs were studied to identify those combinations of vehicle parameters and speed which resulted in the foredeck and driver's station being relatively dry except for an occasional large wave. Making a subjective determination of "relatively dry" is admittedly imprecise. However, it was found that all test conditions which met this arbitrary criterion were further characterized by,

- a. A speed of 6 mph or less, and
- b. A mean running freeboard at the bow of 1.5 ft or more.

The following table identifies by an (X) the vehicle parameters and speeds meeting the above arbitrary criteria:

<u>Deck Height, in</u>	<u>Gross Weight</u>	<u>LCG</u>	<u>Jet Angle</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
78	42,000	2 ⁰ A	0 ⁰	x	x			
	48,000	4 ⁰ A	0 ⁰	x	x	x		
		4 ⁰ A	20 ⁰	x	x	x		
84	42,000	0 ⁰	0 ⁰	x	x			
		2 ⁰ A	0 ⁰	x	x	x		
	48,000	2 ⁰ A	0 ⁰	x	x			
		4 ⁰ A	0 ⁰	x	x	x		

Thus, operation in a sea state 2 will result in a relatively wet foredeck and driver's station unless the configuration of this 78-inch height vehicle is modified. A modification which reduces deck wetness may be expected to extend the present speed limit of 6 mph in a sea state 2.

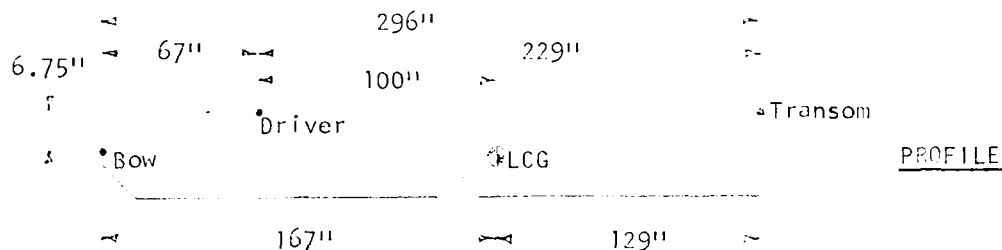
Figure 14 shows that vertical acceleration is relatively insensitive to variations in any of the parameters, including speed. Figure 15 indicates that mean drag in a seaway is relatively insensitive to changes in vehicle parameters and is primarily a function of speed.

R-2155

APPENDIX

CALCULATION OF MEAN RUNNING FREEBOARDS

Condition: Gross Weight 48,000 lb
 Deck Height 72 in
 LCG 45' aft
 Speed 4 mph



Measured: Static Baseline Trim 2.60 deg
 Freeboard at Transom 0.60 ft
 Mean Running Heave at LCG -.17 ft
 Mean Running Baseline Pitch 2.18 deg

Calculations:

Change in inclination = $2.18 - 2.60 = -.42$ deg

Vertical shift due to change in inclination

At transom = $129'' \sin 0.42^\circ = .95''$ or .08 ft
 At driver = $-100 \sin 0.42^\circ = -.73''$ -.06 ft
 At bow = $-167 \sin 0.42^\circ = -1.22''$ -.10 ft

Static freeboards

At driver = $0.6 \text{ ft} + (229 \sin 2.6) 12 = 1.47 \text{ ft}$
 At bow = $0.6 \text{ ft} + (296 \sin 2.6) 12 - 6.75 12 = 1.16 \text{ ft}$

Running freeboards

	Bow	Driver	Transom
Static freeboard	1.16	1.47	0.60
Inclination shift	-.10	-.06	.08
Heave	-.17	-.17	-.17
Running freeboard	.89	1.24	.51

Table 1
AMPHIBIAN TEST MATRIX, SEA STATE 2

Deck Height in	Load lb	LCG .	Static Trim deg	Jet Angle deg	Speed, mph				
					4	5	6	7	8
72 ↓	42,000 ↓	2% F	-2.6	0	9				
		0%	-1.2		2	3			
		2% A	.4		4	5	7	8	
	48,000 ↓	0%	-1.0		17				
		2% A	.8		14	15	16		
		4% A	2.6		10	11	12	13	
	55,000 ↓	2% F	-2.5						
		0%	-.7						
		2% A	1.3		18				
	78 ↓	42,000 ↓	2% F	-2.6	0	22	23		
			0%	-1.2	20	63	62		
			2% A	.4	0	19	20	21	
		48,000 ↓			20	61	60		
					0	24	25	26	27
					20		65	64	66
		55,000 ↓	2% F	-2.5	0	38	39	40	
			0%	-.7	20	59	58		
			2% A	1.3	0	28	29	30	32
84 ↓	42,000 ↓	2% F	-2.6	0	20	55	53		
		0%	-1.2		34	35	36	37	
		2% A	.4				57	56	
	48,000 ↓	0%	-1.0		47				
		2% A	.8		48				
		4% A	2.6		41	43			
	55,000 ↓	2% F	-2.5		45	46			
		0%	-.7			51	52		
		2% A	1.3						
	84 ↓	42,000 ↓	2% F	-2.6	0	89	90		
			0%	-1.0		76	77	78	
			2% A	.8		67	68	69	71
		48,000 ↓					73	74	75
	55,000 ↓	2% F	-2.5		87	88			
		0%	-.7		80	79	81		
		2% A	1.3		82	84	85	86	

R-2155

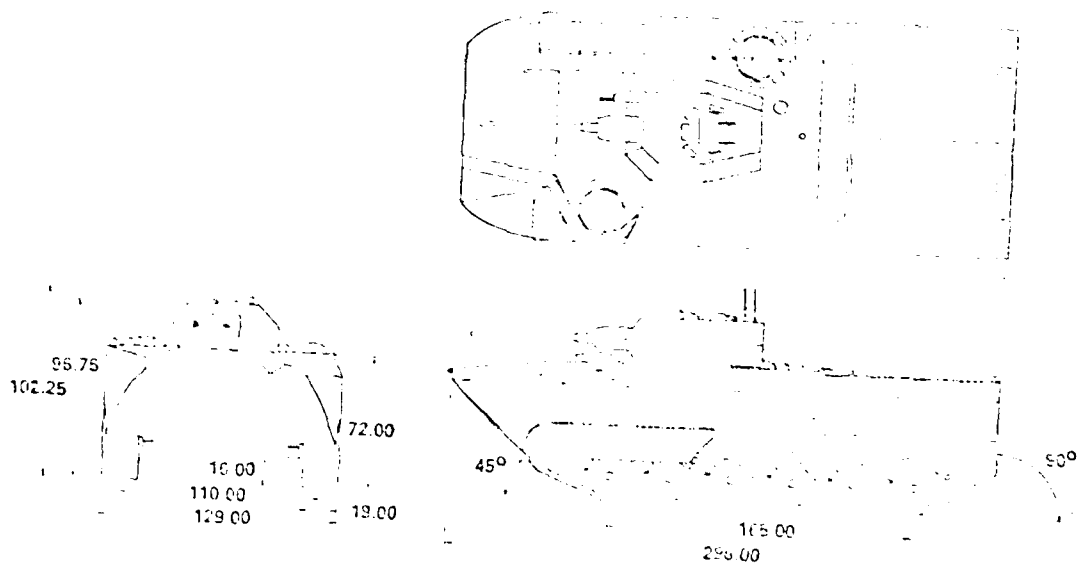


FIGURE 1

R-2155

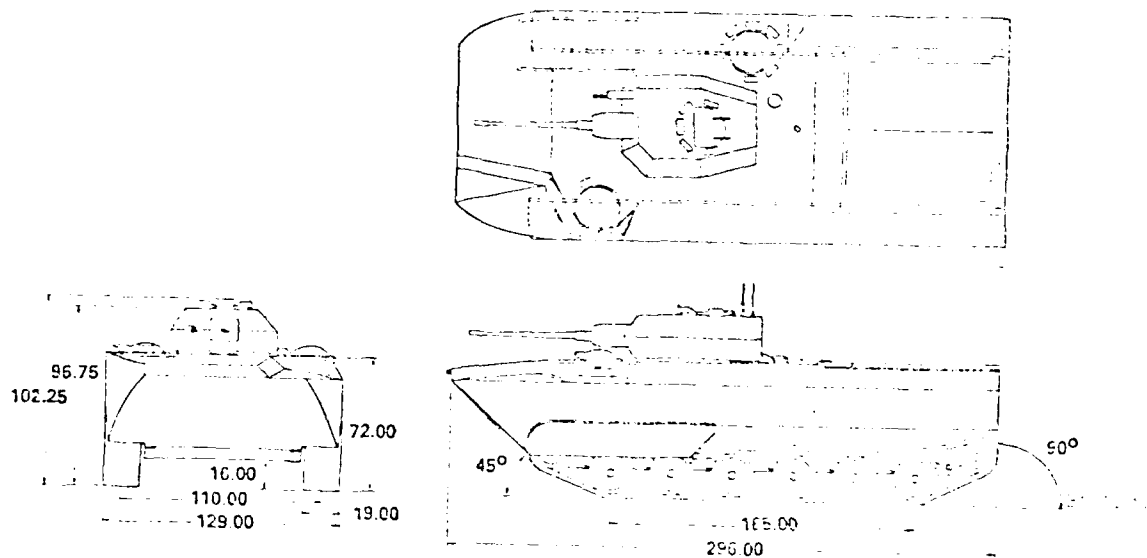


FIGURE 1

R-2155

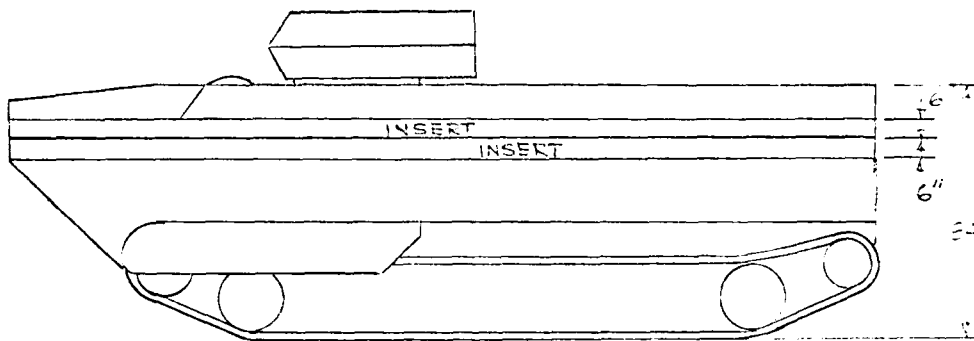


FIGURE 2
INSERTS TO INCREASE HEIGHT FROM 72" TO 78" AND 84"

R-2155

SEA STATE 2
DECK HEIGHT 72"
DISPLACEMENT 42,000 lb
WATER JET ANGLE 0°

LCG

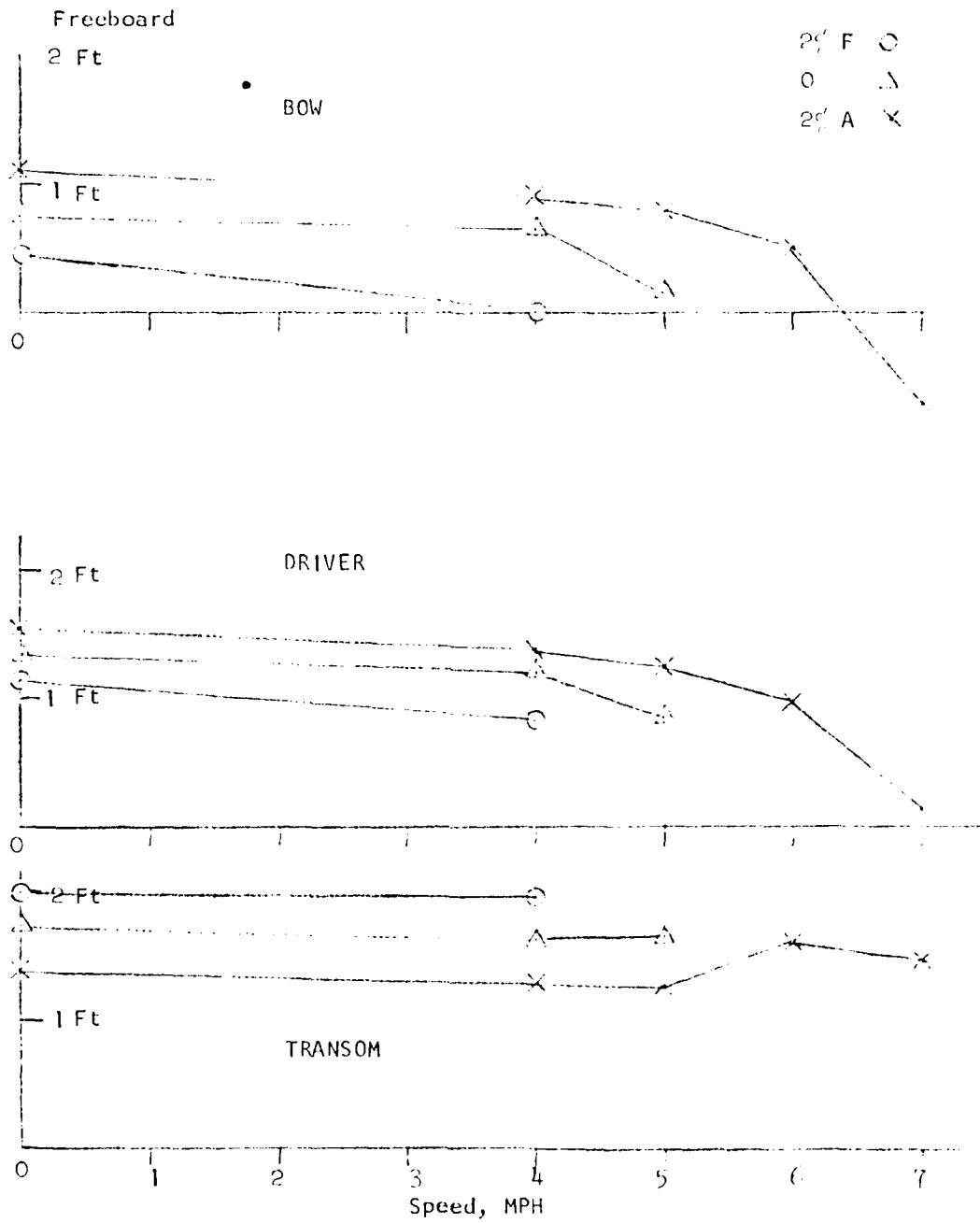


FIGURE 3

R-2150

SEA STATE 2
DECK HEIGHT 78"
DISPLACEMENT 42,000 lb
WATER JET ANGLE 0°

LOG

2°F ○
0° △
2°F X

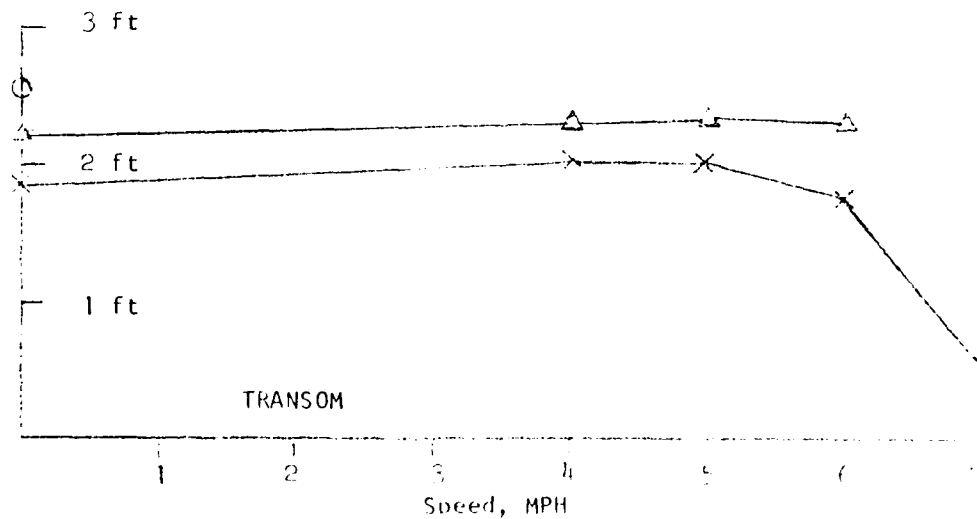
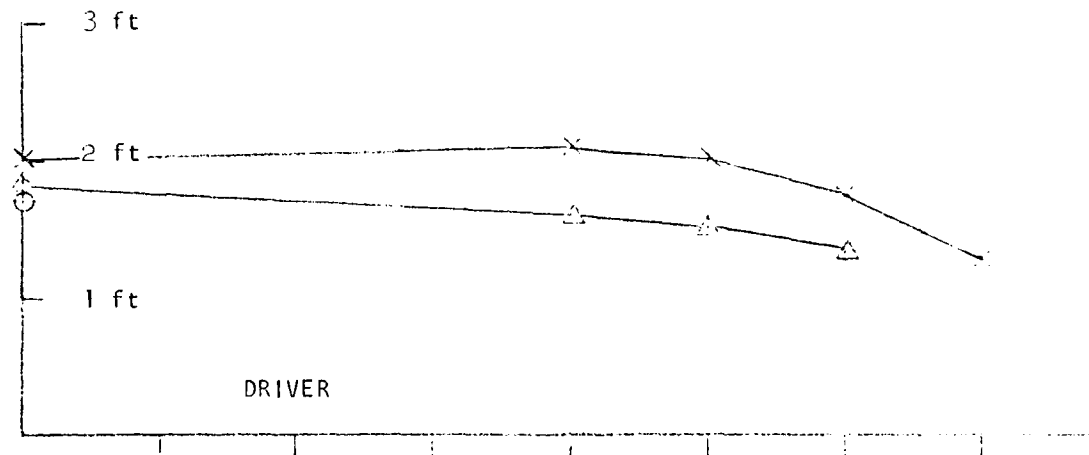
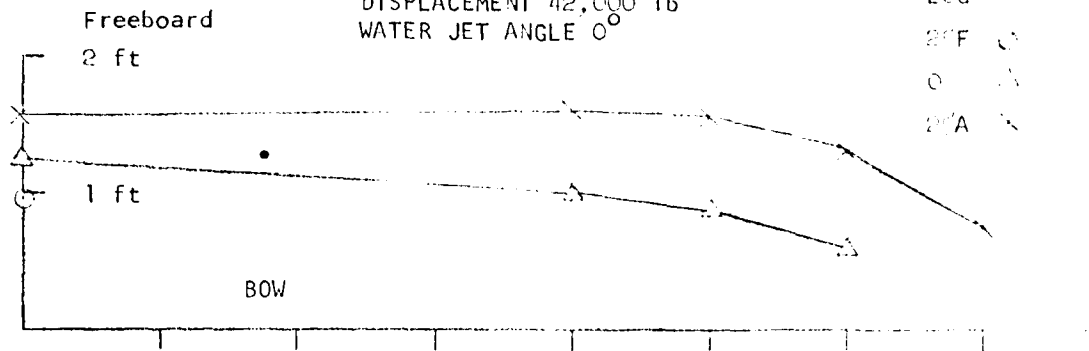


FIGURE 4

R-15'

SEA STATE 2
DECK HEIGHT 78"
DISPLACEMENT 42,000 lb
WATER JET ANGLE 20°

LCG

20F

0

20A

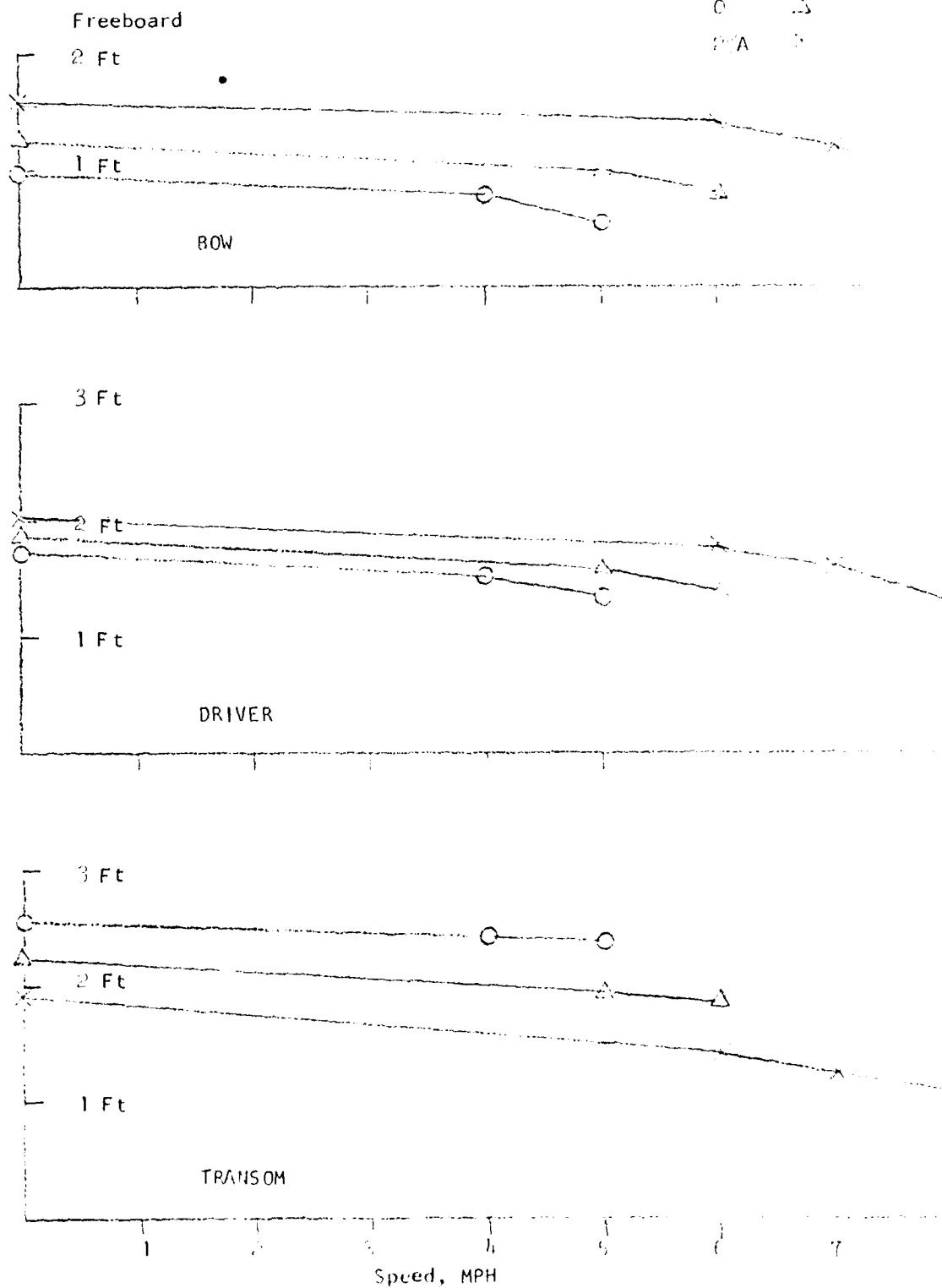


FIGURE 5

R-215

SEA STATE 2
DECK HEIGHT 84"
DISPLACEMENT 42,000 lb
WATER JET ANGLE 0°

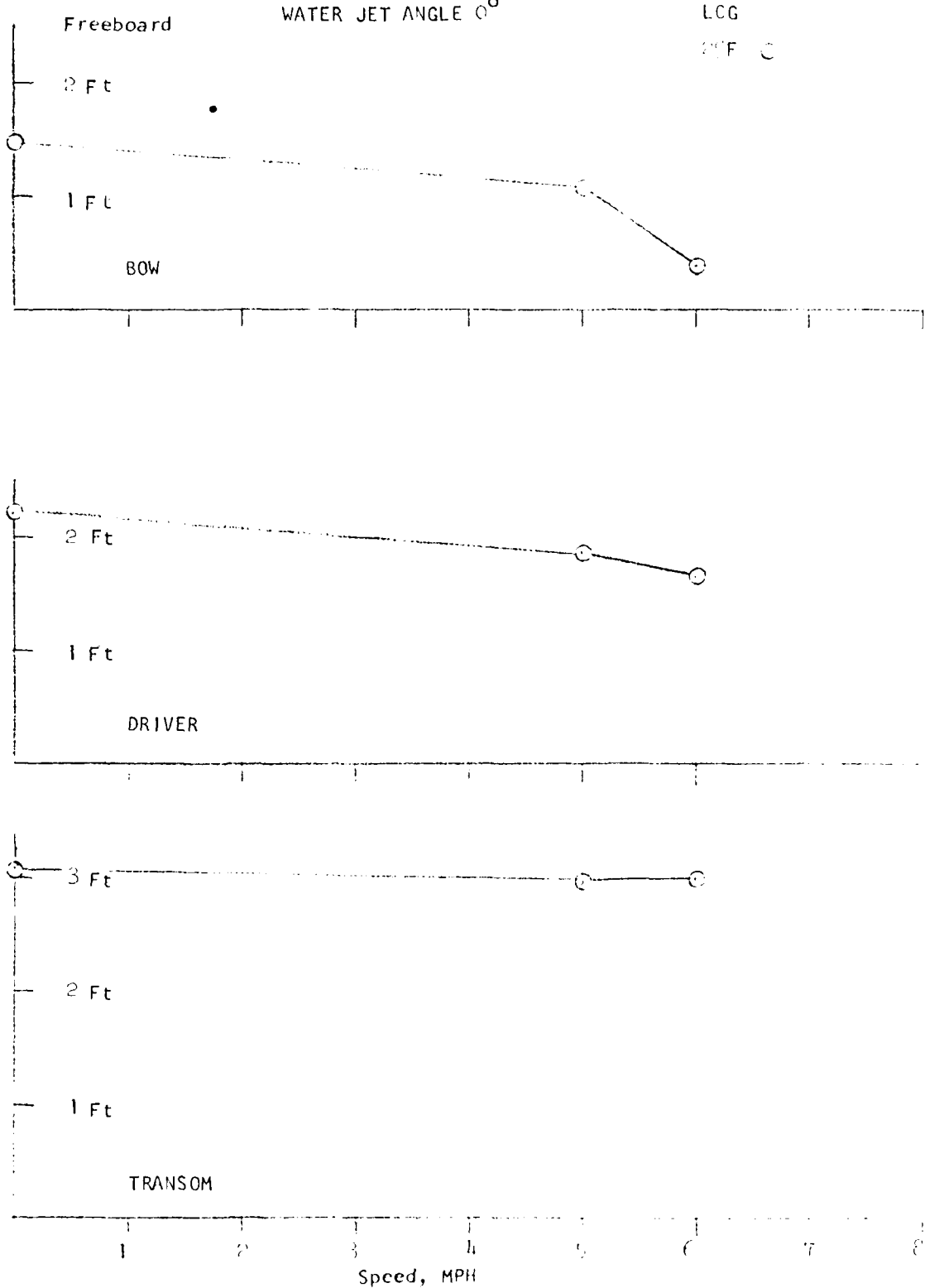


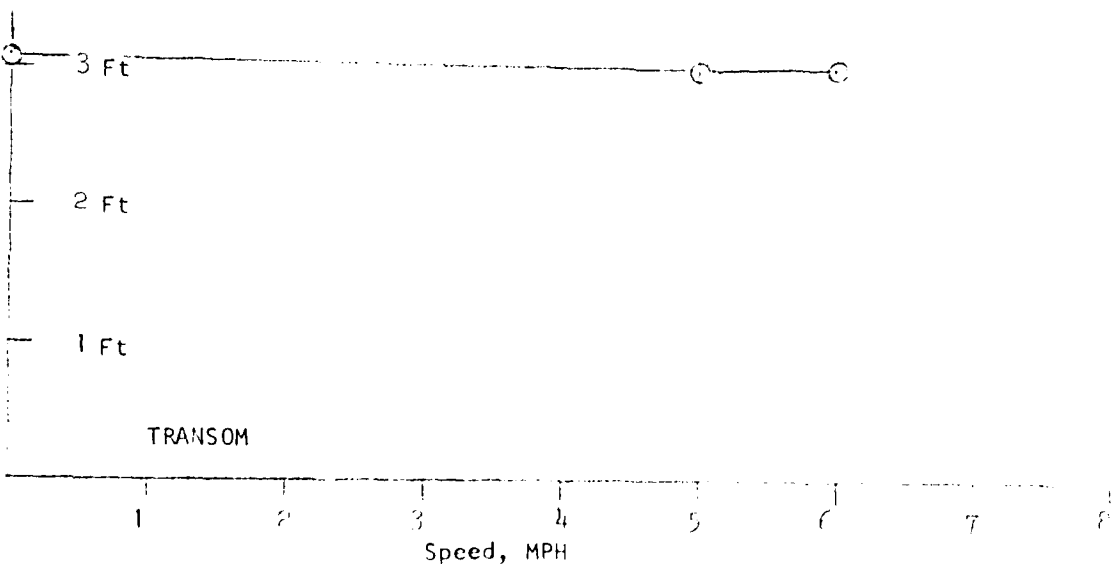
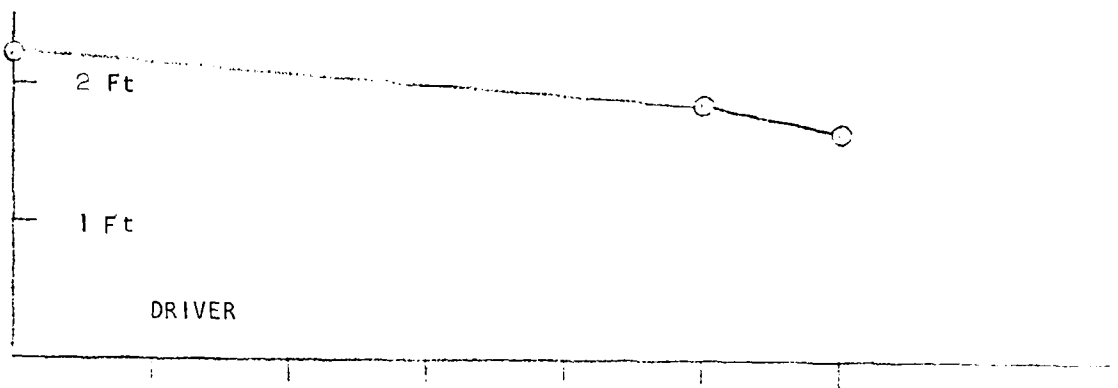
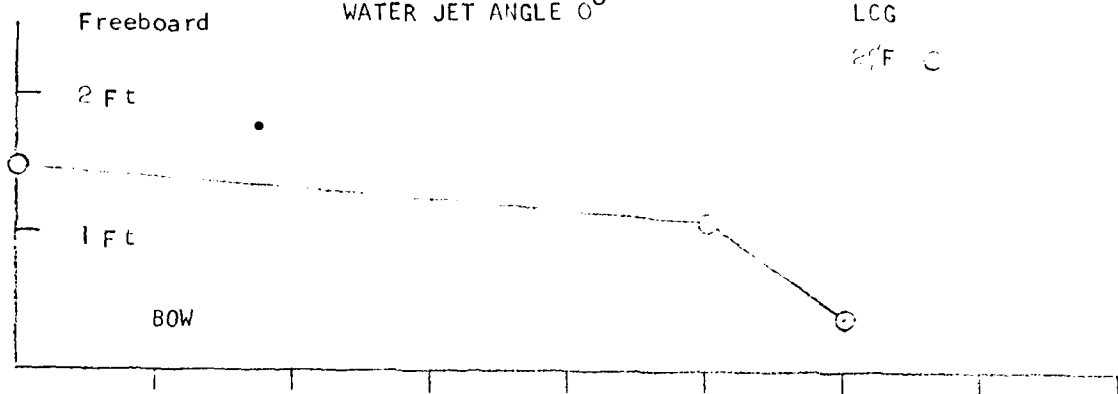
FIGURE 1

R-2155

SEA STATE 2
DECK HEIGHT 84"
DISPLACEMENT 42,000 lb
WATER JET ANGLE 0°

LCG

27' 0"



Speed, MPH

FIGURE 1

R-2155

SEA STATE 2
DECK HEIGHT 72"
DISPLACEMENT 48,000 LB
WATER JET ANGLE 0°

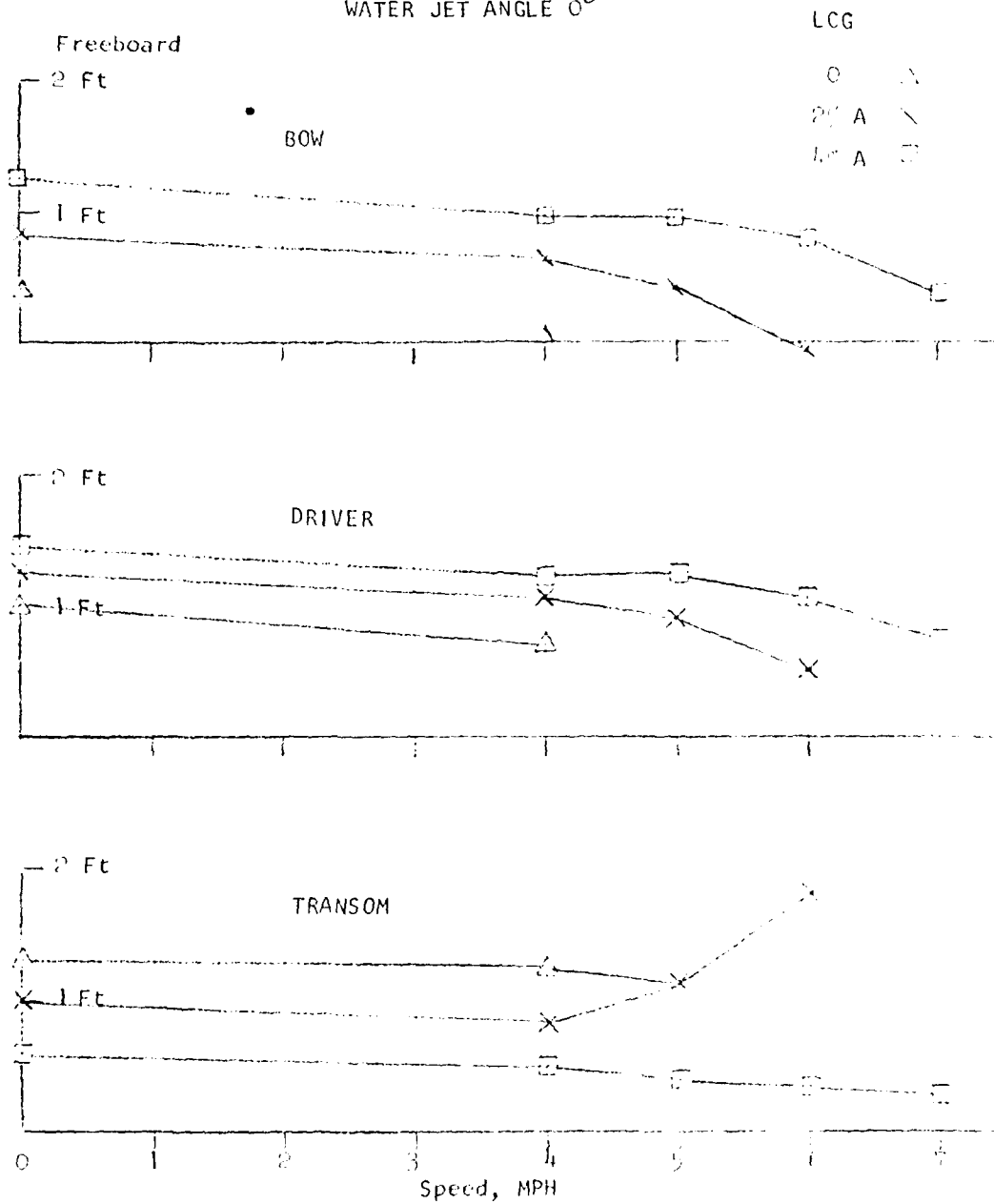


FIGURE 7

R-0114

SEA STATE 2
DECK HEIGHT 78"
DISPLACEMENT 48,000 lb
WATERJET ANGLE 0°

LCG

0

10A

20A

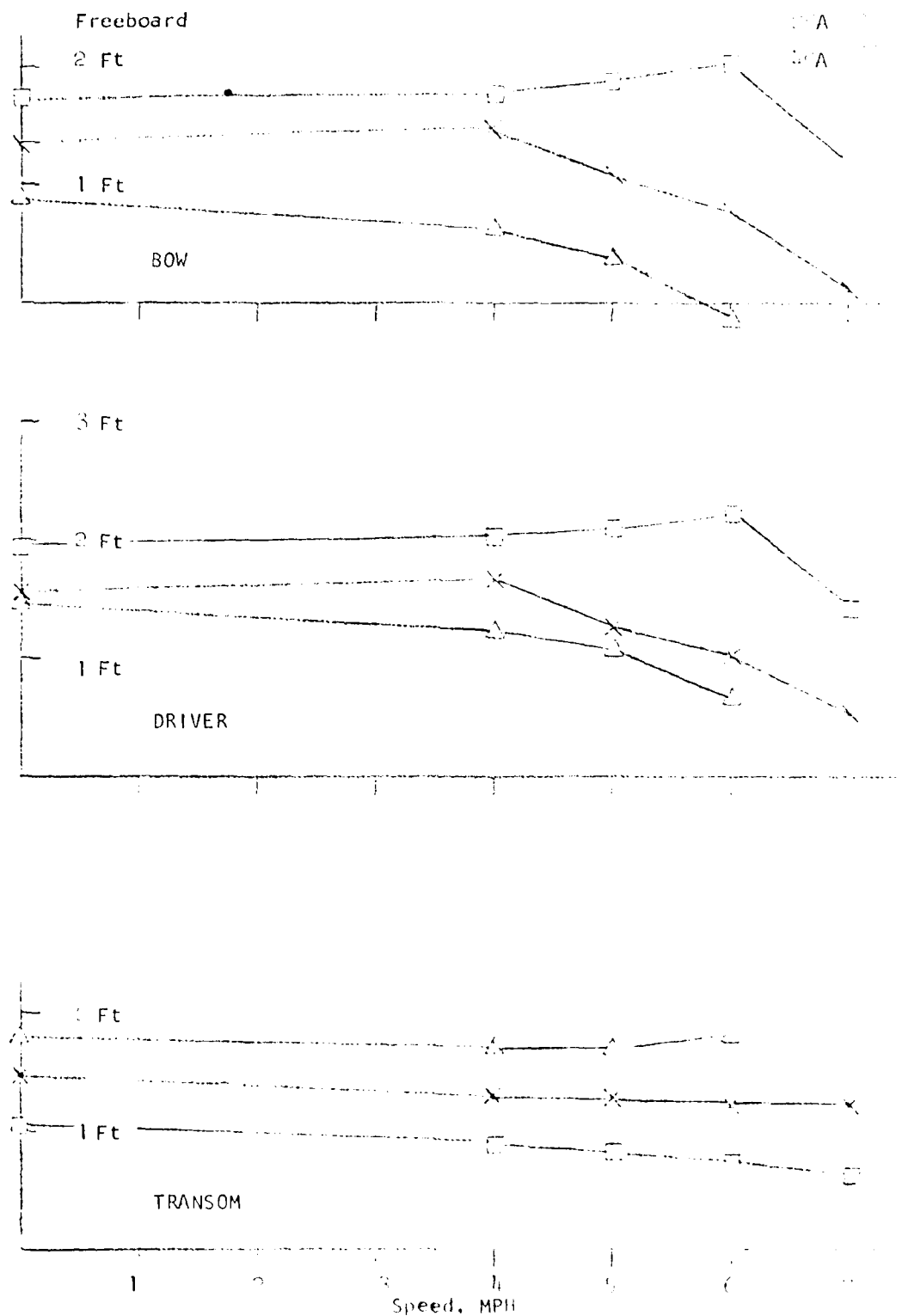


FIGURE 8

R-115

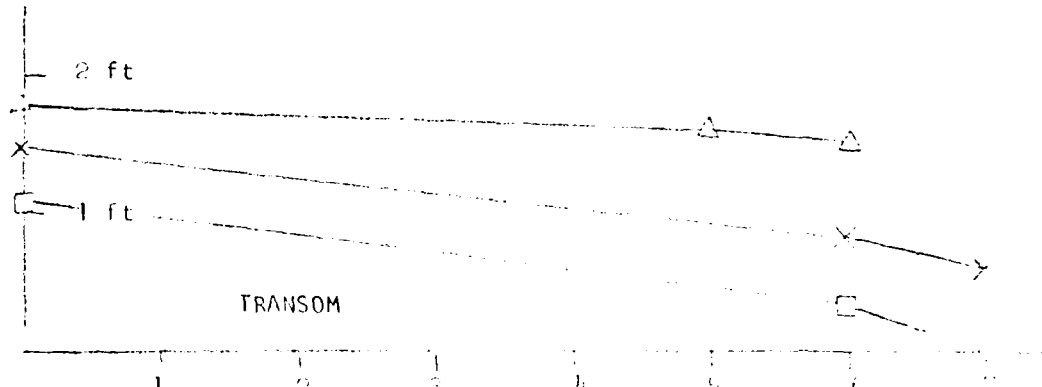
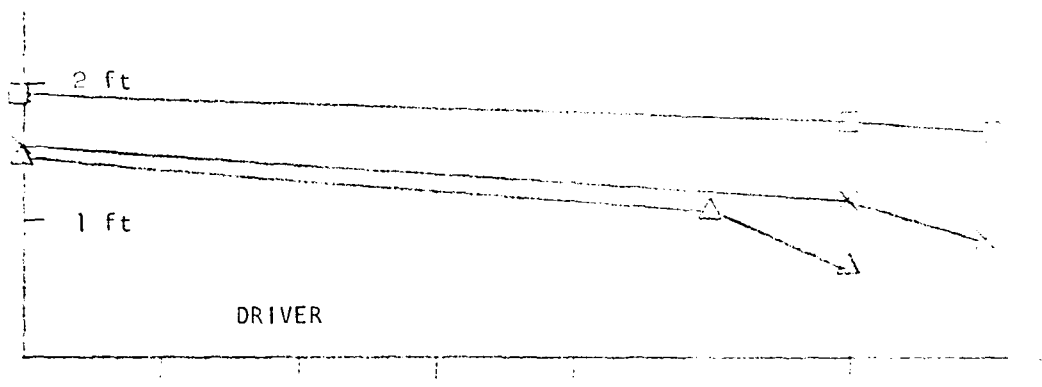
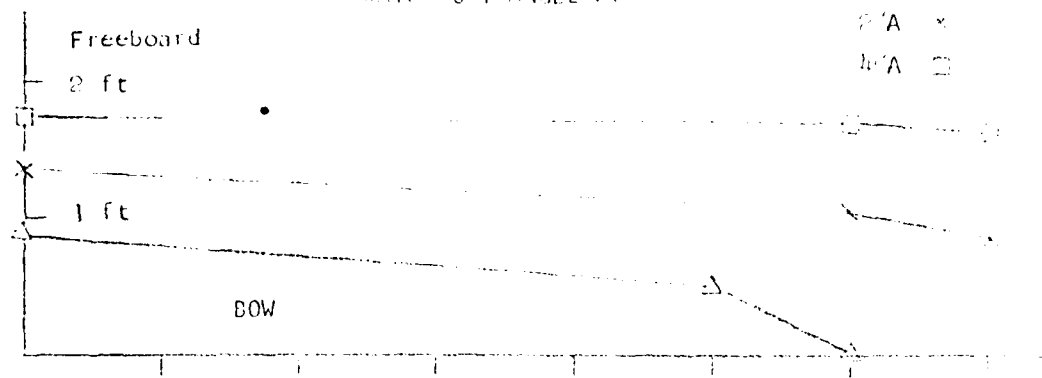
SEA STATE 2
 DECK HEIGHT 18"
 DISPLACEMENT 48,000 lb
 WATER LIFT ANGLE 15°

LCG

G A

P/A X

M/A □



Speed, MPH

FIGURE 9

R-100

SEA STATE 2
DECK HEIGHT 34"
DISPLACEMENT 48,000 lb
WATER JET ANGLE 0°

LCG

0 A

0° A

4 A

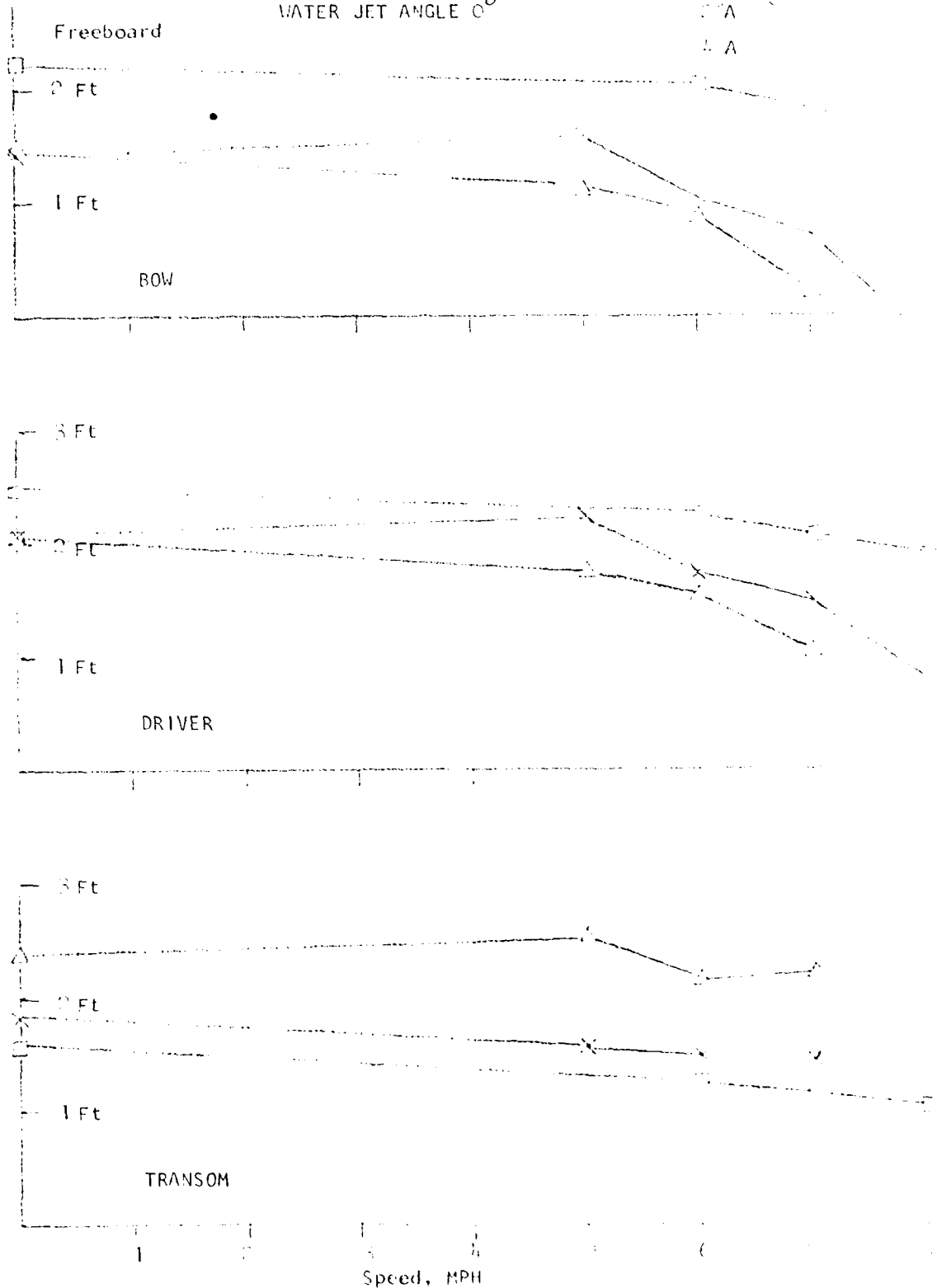


FIGURE 10

R-155

SEA STATE 2
DECK HEIGHT 78"
DISPLACEMENT 55,000 lb
WATER JET ANGLE 0°

LCG
27F C
O N
27A S

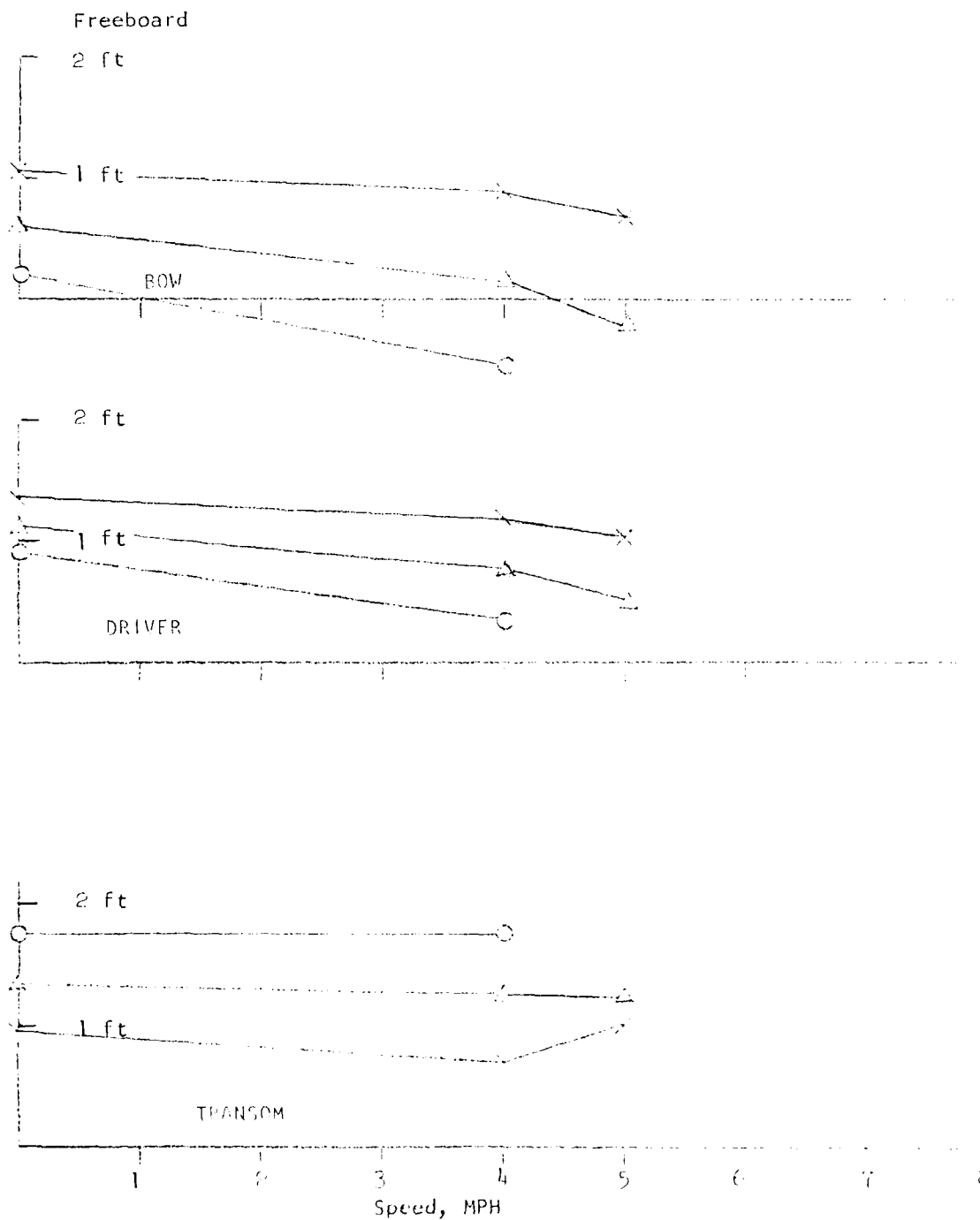
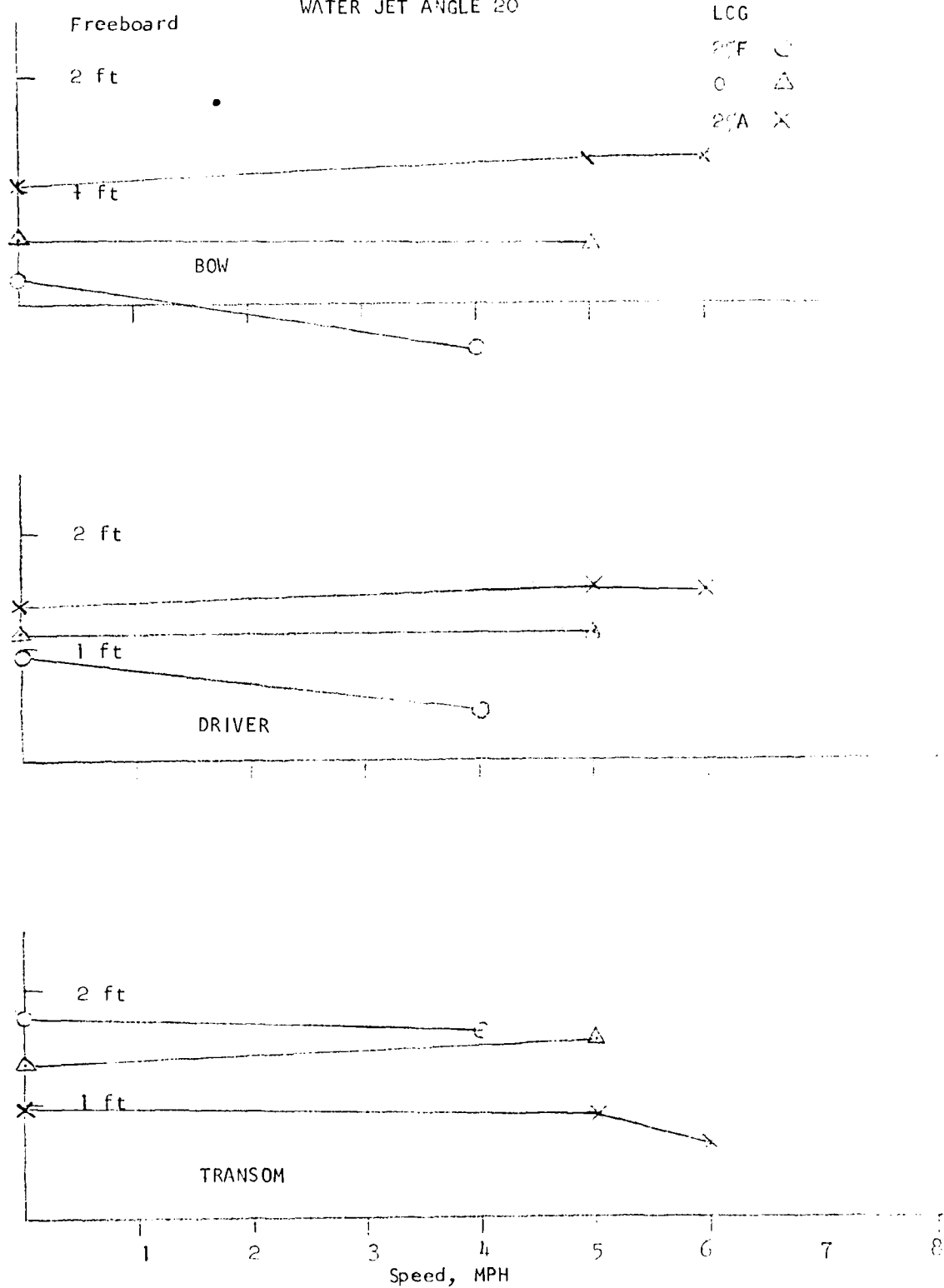


FIGURE 11

R-2155

SEA STATE 2
DECK HEIGHT 78"
DISPLACEMENT 55,000 lb
WATER JET ANGLE 20°



R-114

SEA STATE 2
DECK HEIGHT 84"
DISPLACEMENT 55,000 lb
WATER JET ANGLE 0°

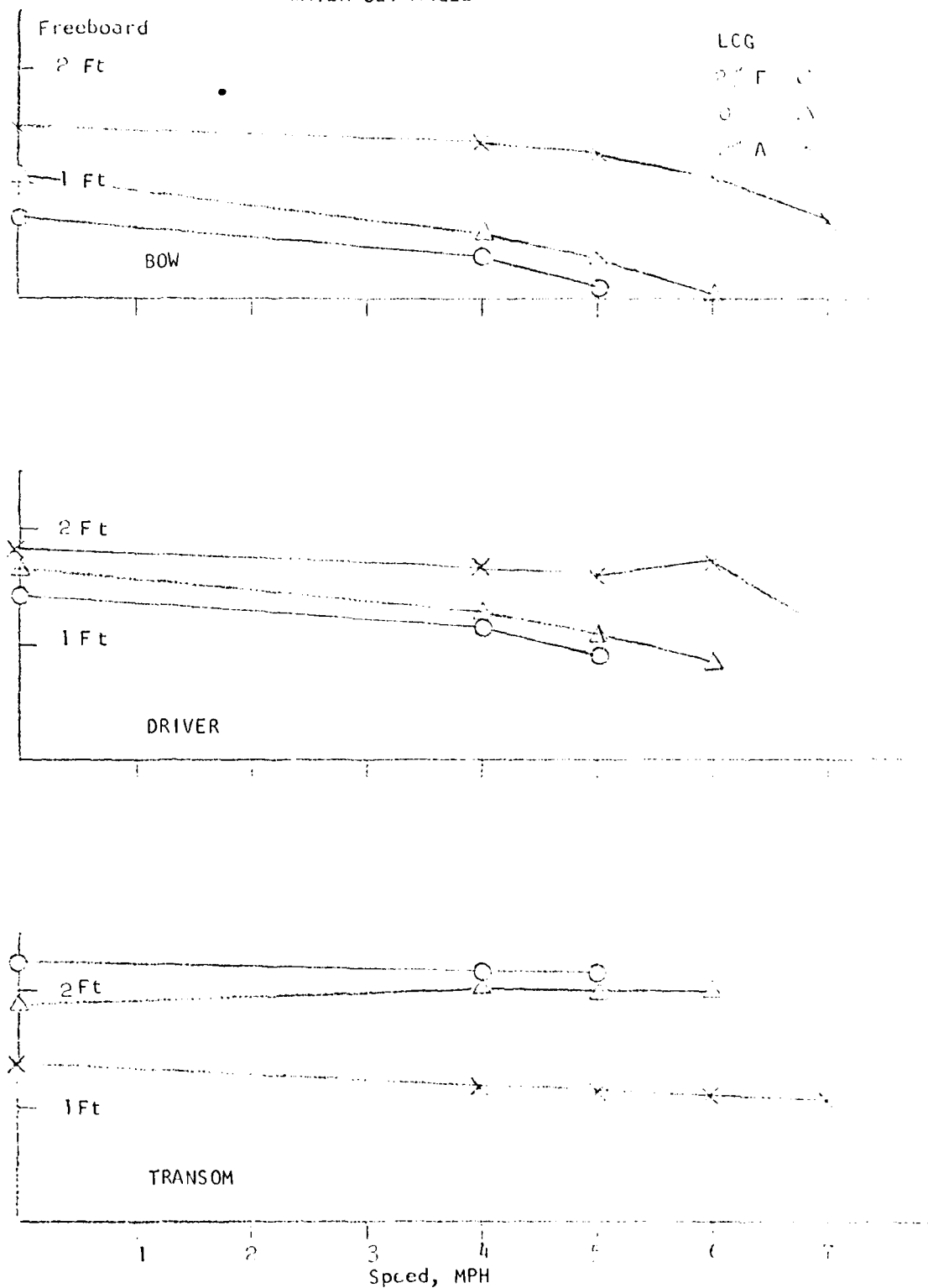


FIGURE 13

R-2115

ALL DISPLACEMENTS, ALL CG POSITIONS
SEA STATE 2

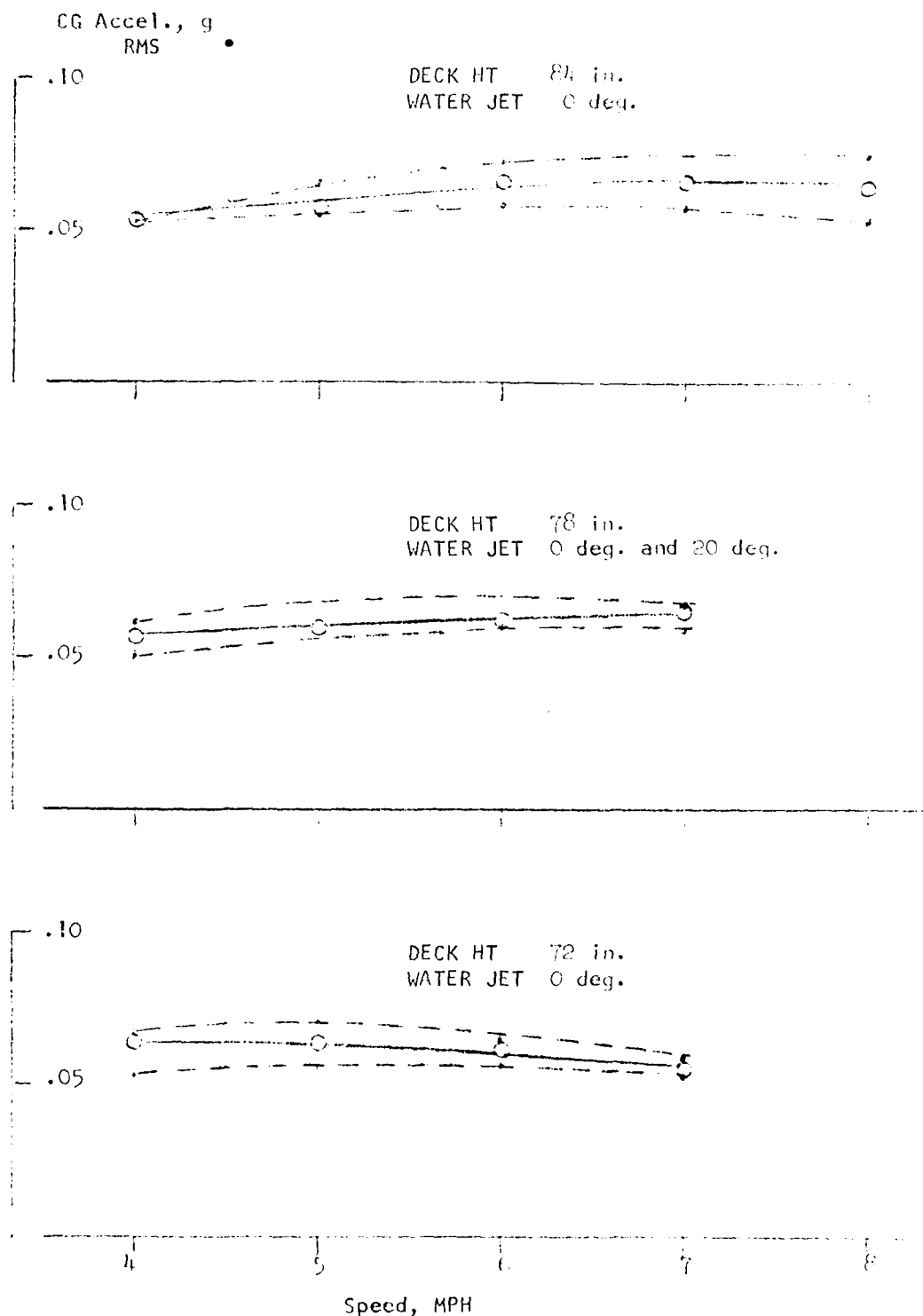


FIGURE 14

ALL DECK HEIGHTS, ALL CG POSITIONS
SEA STATE 2

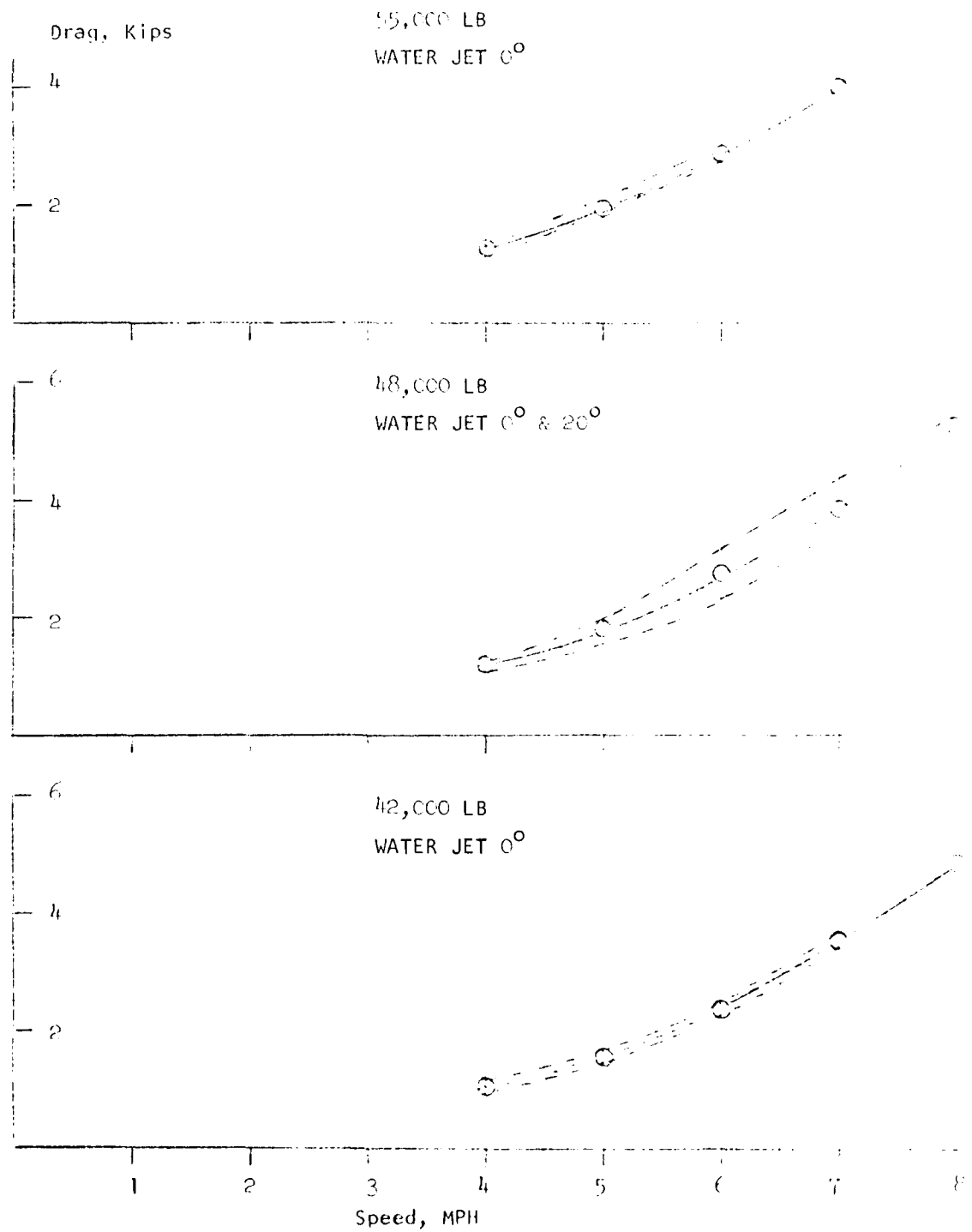


FIGURE 15

RESPONSES IN IRREGULAR WAVES

All values are for full-scale vehicle.

SPEED is in statute miles per hour

DRAG is mean resistance in waves in units of 1000 lb (kip)

LOAD is gross vehicle weight in units of 1000 lb (kip)

SIGNIFICANT WAVE HEIGHT is average of one-third highest crest-to-trough heights

LCG is inches aft of bow

PITCH is about a transverse space axis with bow up as positive

HEAVE at the CG is along a vertical space axis with up as positive

CG ACC is acceleration along a vertical body axis at 161 inches aft of the bow, with up as positive

All motion and acceleration statistics are referred to a still water datum.

MEAN is mean of all oscillations

RMS is root mean square of oscillations

OSC is number of oscillations used for averages; oscillations of less than the following limiting values, peak-to-trough, are not counted

Pitch 1.0 deg

Heave 0.1 ft

Vert. Acc. 0.05 G

AVG is average of all counted oscillations

1-3, 1-10 are averages of highest third and highest tenth of all counted oscillations

EXTREME are values, (+) and (-), encountered in the particular reproducible wave sequence used in the test, and should not be construed as the extremes in any other sea having the same significant height

TR - 2155

DAVIDSON LABORATORY

2-OCT-80

AMPHIBIOUS VEHICLE

RUN	2	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 4.00 MPH	WAVE ENCOUNTERS 72				
		DRAG 0.94 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.724	72	2.04	4.07	5.59	6.97
		2.984		-5.53	-7.61	-8.96	-10.84
HEAVE FT.		-0.177	62	0.35	0.67	0.92	1.10
		0.425		-0.70	-1.02	-1.26	-1.57
CG ACC G		-0.002	73	0.08	0.12	0.15	0.19
		0.058		-0.08	-0.12	-0.16	-0.19

RUN	3	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 59				
		DRAG 1.46 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-2.359	59	0.70	2.67	3.98	5.38
		2.564		-5.60	-7.67	-9.15	-11.25
HEAVE FT.		-0.314	49	0.21	0.56	0.90	1.34
		0.433		-0.83	-1.21	-1.56	-1.98
CG ACC G		0.036	61	0.08	0.13	0.21	0.24
		0.066		-0.09	-0.12	-0.15	-0.23

TR - 2155

DAVIDSON LABORATORY

2-OCT-80

AMPHIBIOUS VEHICLE

RUN	4	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 4.00 MPH	WAVE ENCOUNTERS 36				
		DRAG 1.04 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.316	81	4.50	6.64	8.51	10.13
		3.295		-3.45	-6.07	-7.39	-9.60
HEAVE FT.		-0.143	70	0.36	0.66	0.94	1.17
		0.428		-0.62	-0.92	-1.27	-1.43
CG ACC G		-0.004	89	0.09	0.15	0.17	0.22
		0.067		-0.09	-0.12	-0.14	-0.19

RUN	5	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 67				
		DRAG 1.52 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.119	59	3.98	6.15	7.38	8.62
		2.953		-3.66	-5.56	-7.28	-8.94
HEAVE FT.		-0.225	53	0.28	0.63	0.86	1.10
		0.427		-0.73	-1.10	-1.28	-1.59
CG ACC G		-0.010	73	0.07	0.13	0.16	0.17
		0.070		-0.09	-0.13	-0.16	-0.22

TR - 2155

DAVIDSON LABORATORY

2-OCT-80

* AMPHIBIOUS VEHICLE

RUN	7	Deck Ht. 72 in	Water Jet	0 deg			
		SPEED 6.00 MPH		WAVE ENCOUNTERS	60		
		DRAG 2.31 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 42.00 KIP		LCG	161.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-0.505	50	2.67	4.56	5.85	7.54
		2.589		-3.81	-5.67	-7.34	-10.35
HEAVE FT.		-0.379	43	0.16	0.52	0.76	0.89
		0.447		-0.92	-1.27	-1.54	-2.23
CG ACC G		-0.005	44	0.08	0.13	0.17	0.23
		0.062		-0.09	-0.14	-0.17	-0.19

RUN	8	Deck Ht. 72 in	Water Jet	0 deg			
		SPEED 7.00 MPH		WAVE ENCOUNTERS	53		
		DRAG 3.64 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 42.00 KIP		LCG	161.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-3.862	38	-1.38	-0.14	0.71	1.54
		1.826		-6.36	-7.46	-8.12	-8.48
HEAVE FT.		-0.796	37	-0.36	-0.08	0.09	0.14
		0.349		-1.23	-1.47	-1.64	-1.76
CG ACC G		-0.007	38	0.07	0.11	0.13	0.16
		0.051		-0.08	-0.11	-0.13	-0.15

TR - 2155

DAVIDSON LABORATORY

2-OCT-80

" AMPHIBIOUS VEHICLE

RUN	9	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 4.00 MPH		WAVE ENCOUNTERS	72		
		DRAG 0.97 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 42.00 KIP			LCG 149.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-3.431	72	-0.24	1.46	2.41	3.91
		2.586		-6.74	-8.78	-10.04	-11.03
HEAVE FT.		-0.211	63	0.28	0.61	0.84	1.00
		0.416		-0.71	-1.07	-1.32	-1.61
CG ACC G		-0.003	68	0.07	0.11	0.14	0.19
		0.055		-0.08	-0.11	-0.14	-0.19

RUN	10	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 4.00 MPH		WAVE ENCOUNTERS	74		
		DRAG 1.19 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 48.00 KIP			LCG 167.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.185	70	6.71	9.43	11.07	14.40
		3.615		-2.41	-4.99	-7.03	-8.18
HEAVE FT.		-0.167	60	0.34	0.69	0.98	1.11
		0.417		-0.67	-0.99	-1.31	-1.58
CG ACC G		-0.005	68	0.07	0.11	0.14	0.19
		0.053		-0.09	-0.13	-0.16	-0.19

TR - 2155

DAVIDSON LABORATORY

2-OCT-80

AMPHIBIOUS VEHICLE

RUN	11	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 61				
		DRAG 1.71 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 167.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.435	58	6.38	9.19	11.58	13.32
		3.358		-1.66	-4.38	-6.35	-8.32
HEAVE FT.		-0.219	50	0.27	0.66	0.99	1.37
		0.425		-0.72	-1.11	-1.44	-1.72
CG ACC G		-0.007	58	0.07	0.12	0.16	0.21
		0.058		-0.09	-0.14	-0.19	-0.23

RUN	12	Deck Ht. 70 in	Water Jet 0 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 64				
		DRAG 2.49 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 167.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.094	52	5.88	8.10	9.66	11.21
		3.060		-1.63	-3.87	-5.34	-6.42
HEAVE FT.		-0.336	44	0.19	0.55	0.73	0.98
		0.445		-0.90	-1.27	-1.56	-1.83
CG ACC G		-0.004	51	0.09	0.15	0.21	0.29
		0.064		-0.09	-0.14	-0.18	-0.22

TR - 2155

DAVIDSON LABORATORY

2-OCT-80

AMPHIBIOUS VEHICLE

RUN	13	Deck Ht. 72 in	Water Jet	0 deg		
		SPEED 7.00 MPH		WAVE ENCOUNTERS	65	
		DRAW 3.41 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT	
		LOAD 48.00 KIP			LCG 167.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10
						EXTREME
PITCH DEG		1.339	43	4.13	5.80	6.56
		2.313		-1.78	-3.24	-4.07
HEAVE FT.		-0.563	42	-0.11	0.21	0.44
		0.391		-1.04	-1.32	-1.46
CG ACC G		-0.002	44	0.09	0.14	0.19
		0.059		-0.09	-0.14	-0.18

RUN	14	Deck Ht. 72 in	Water Jet	0 deg		
		SPEED 4.00 MPH		WAVE ENCOUNTERS	91	
		DRAW 1.12 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT	
		LOAD 48.00 KIP			LCG 161.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10
						EXTREME
PITCH DEG		0.665	70	4.83	7.22	8.82
		3.326		-3.67	-5.91	-7.59
HEAVE FT.		-0.188	61	0.33	0.67	0.87
		0.428		-0.70	-1.06	-1.33
CG ACC G		-0.006	66	0.07	0.11	0.14
		0.053		-0.08	-0.12	-0.14

TR - 2155

DAVIDSON LABORATORY

2-OCT-60

AMPHIBIOUS VEHICLE

RUN	15	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 62				
		DRAW 1.59 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.125	57	3.54	5.95	7.48	9.77
		2.851		-3.37	-5.81	-7.87	-10.23
HEAVE FT.		-0.269	48	0.26	0.64	0.93	1.42
		0.441		-0.80	-1.22	-1.57	-1.80
CG ACC G		-0.005	52	0.07	0.12	0.16	0.20
		0.056		-0.08	-0.13	-0.16	-0.22

RUN	16	Deck Ht. 72 in	Water Jet 0 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 57				
		DRAW 2.46 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.055	46	2.02	3.84	5.20	6.22
		2.414		-4.20	-5.72	-6.95	-7.52
HEAVE FT.		-0.492	41	0.01	0.34	0.50	0.68
		0.414		-1.00	-1.35	-1.55	-1.72
CG ACC G		-0.004	43	0.08	0.12	0.15	0.17
		0.056		-0.08	-0.12	-0.15	-0.17

TR - 2155

DAVIDSON LABORATORY

6-OCT-80

AMPHIBIOUS VEHICLE

RUN	17	Deck Ht. 72 in		Water Jet 0 deg			
		SPEED	4.00 MPH	WAVE ENCOUNTERS		70	
		DRAG	1.16 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
		LOAD	48.00 KIP			LCG 155.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.744	71	1.54	3.54	4.67	7.38
		2.702		-5.18	-7.28	-8.56	-10.17
HEAVE FT.		-0.224	61	0.28	0.61	0.87	1.08
		0.418		-0.74	-1.07	-1.32	-1.47
CG ACC G		-0.002	67	0.08	0.14	0.23	0.17
		0.055		-0.07	-0.11	-0.14	-0.16

RUN	18	Deck Ht. 72 in		Water Jet 0 deg			
		SPEED	4.00 MPH	WAVE ENCOUNTERS		69	
		DRAG	1.37 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
		LOAD	55.00 KIP			LCG 161.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		1.222	67	5.33	7.71	9.37	10.37
		3.362		-2.97	-4.89	-6.24	-7.34
HEAVE FT.		-0.285	58	0.21	0.49	0.71	0.85
		0.417		-0.77	-1.09	-1.33	-1.61
CG ACC G		-0.005	66	0.07	0.11	0.14	0.17
		0.105		-0.07	-0.10	-0.12	-0.16

TR - 2155

DAVIDSON LABORATORY

6-OCT-80

AMPHIBIOUS VEHICLE

RUN	19	Deck Ht. 78 in	Water Jet 0 deg				
		SPEED 4.00 MPH	WAVE ENCOUNTERS 68				
		DRAW 1.10 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.412	75	2.67	5.10	6.66	8.52
		3.219		-5.44	-7.62	-8.81	-10.41
HEAVE FT.		-0.135	63	0.40	0.73	0.99	1.24
		0.439		-0.66	-1.03	-1.28	-1.37
CG ACC G		-0.001	70	0.08	0.12	0.15	0.19
		0.060		-0.08	-0.12	-0.15	-0.17

RUN	20	Deck Ht. 78 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 61				
		DRAW 1.57 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.821	59	1.71	3.99	5.72	7.62
		2.861		-5.42	-7.72	-9.50	-10.45
HEAVE FT.		-0.232	53	0.28	0.67	1.02	1.23
		0.443		-0.75	-1.15	-1.47	-1.76
CG ACC G		-0.003	59	0.08	0.14	0.20	0.24
		0.065		-0.08	-0.14	-0.19	-0.24

TR - 2155

DAVIDSON LABORATORY

6-OCT-80

* AMPHIBIOUS VEHICLE

RUN	21	Deck Ht. 78 in	Water Jet	0 deg			
		SPEED 6.00 MPH		WAVE ENCOUNTERS	51		
		DRAG 2.42 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 42.00 KIP			LCG 155.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-2.466	51	0.59	2.59	3.85	5.20
		2.549		-5.64	-7.63	-9.02	-10.28
HEAVE FT.		-0.348	43	0.20	0.57	0.83	1.08
		0.457		-0.90	-1.30	-1.61	-1.90
CG ACC G		-0.002	48	0.09	0.14	0.19	0.21
		0.066		-0.09	-0.14	-0.17	-0.23

RUN	22	Deck Ht. 78 in	Water Jet	0 deg			
		SPEED 4.00 MPH		WAVE ENCOUNTERS	67		
		DRAG 1.09 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 42.00 KIP			LCG 149.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-2.091	73	1.64	3.82	5.45	7.21
		2.907		-5.69	-7.67	-9.07	-11.95
HEAVE FT.		0.174	65	0.69	1.09	1.37	1.53
		0.444		-0.34	-0.70	-1.03	-1.31
CG ACC G		-0.000	68	0.08	0.12	0.15	0.20
		0.058		-0.08	-0.13	-0.16	-0.19

IR - 2155

DAVIDSON LABORATORY

7-OCT-80

AMPHIBIOUS VEHICLE

RUN	23	Deck Ht. 78 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 58				
		DRAG 1.61 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 149.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-0.870	62	2.25	4.62	5.84	8.33
		2.619		-3.88	-6.06	-7.47	-9.58
HEAVE FT.		0.314	49	0.85	1.27	1.63	1.89
		0.450		-0.22	-0.58	-0.93	-1.31
CG ACC G		0.001	55	0.08	0.13	0.17	0.22
		0.061		-0.08	-0.13	-0.17	-0.21

RUN	24	Deck Ht. 78 in	Water Jet 0 deg				
		SPEED 4.00 MPH	WAVE ENCOUNTERS 66				
		DRAG 1.16 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.201	73	4.63	7.03	8.57	10.86
		3.506		-4.26	-6.92	-8.76	-9.84
HEAVE FT.		0.119	63	0.65	0.98	1.24	1.42
		0.432		-0.41	-0.73	-1.01	-1.23
CG ACC G		0.000	70	0.08	0.12	0.16	0.20
		0.058		-0.08	-0.13	-0.16	-0.18

IR - 2155

DAVIDSON LABORATORY

7-OCT-80

AMPHIBIOUS VEHICLE

RUN	25	Deck Ht. 78 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 57				
		DRAG 1.67 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.408	63	4.47	7.11	8.72	11.71
		3.430		-3.77	-6.71	-8.83	-10.52
HEAVE FT.		0.195	51	0.75	1.17	1.52	1.75
		0.463		-0.35	-0.75	-1.05	-1.54
CG ACC G		0.001	60	0.09	0.14	0.18	0.26
		0.065		-0.08	-0.14	-0.19	-0.23

RUN	26	Deck Ht. 78 in	Water Jet 0 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 49				
		DRAG 2.44 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.808	51	4.84	6.95	8.08	9.26
		3.078		-3.10	-5.05	-6.40	-9.68
HEAVE FT.		0.332	48	0.89	1.28	1.51	1.97
		0.484		-0.23	-0.61	-0.85	-1.27
CG ACC G		-0.000	50	0.10	0.15	0.18	0.27
		0.072		-0.10	-0.15	-0.17	-0.23

TR - 2155

DAVIDSON LABORATORY

7-OCT-80

AMPHIBIOUS VEHICLE

RUN	27	Deck Ht. 78 in	Water Jet	0 deg			
		SPEED 7.00 MPH		WAVE ENCOUNTERS	48		
		DRAG 3.43 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 42.00 KIP			LCG 161.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-0.961	43	2.18	4.03	5.16	6.70
		2.435		-4.15	-5.66	-6.74	-7.71
HEAVE FT.		-0.508	40	0.01	0.37	0.54	0.60
		0.432		-1.04	-1.33	-1.57	-1.80
CG ACC G		-0.001	42	0.09	0.14	0.16	0.21
		0.067		-0.10	-0.14	-0.17	-0.20

RUN	28	Deck Ht. 78 in	Water Jet	0 deg			
		SPEED 4.00 MPH		WAVE ENCOUNTERS	69		
		DRAG 1.25 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 48.00 KIP			LCG 161.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.876	72	5.51	7.93	9.26	11.83
		3.616		-3.73	-6.03	-7.24	-9.76
HEAVE FT.		-0.150	62	0.40	0.76	0.99	1.24
		0.447		-0.70	-1.03	-1.28	-1.43
CG ACC G		-0.002	67	0.08	0.12	0.14	0.18
		0.057		-0.08	-0.12	-0.15	-0.18

TR - 2155

DAVIDSON LABORATORY

7-OCT-80

° AMPHIBIOUS VEHICLE

RUN	29	Deck Ht. 78 in		Water Jet 0 deg			
		SPEED	5.00 MPH	WAVE ENCOUNTERS		59	
		DRAG	1.81 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
		LOAD	48.00 KIP	LCG		161.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.614	59	4.69	7.41	9.32	10.61
		3.302		-3.47	-6.00	-7.81	-9.73
HEAVE FT.		-0.223	51	0.30	0.71	1.00	1.50
		0.454		-0.75	-1.17	-1.50	-1.75
CG ACC G		-0.004	55	0.08	0.13	0.18	0.22
		0.061		-0.09	-0.14	-0.18	-0.24

RUN	30	Deck Ht. 78 in		Water Jet 0 deg			
		SPEED	6.00 MPH	WAVE ENCOUNTERS		53	
		DRAG	2.61 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
		LOAD	48.00 KIP	LCG		161.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.084	48	3.69	5.98	7.10	9.60
		2.899		-3.65	-5.76	-7.40	-8.75
HEAVE FT.		-0.389	41	0.19	0.59	0.83	1.10
		0.468		-0.98	-1.35	-1.61	-2.09
CG ACC G		-0.002	46	0.08	0.12	0.14	0.21
		0.066		-0.09	-0.14	-0.16	-0.22

TR - 2155

DAVIDSON LABORATORY

7-OCT-80

AMPHIBIOUS VEHICLE

RUN 32

Deck Ht. 78 in

Water Jet 0 deg

SPEED 7.00 MPH
DRAG 3.94 KIP
LOAD 48.00 KIP

WAVE ENCOUNTERS 46
SIGNIFICANT WAVE HEIGHT 2.20 FT
LCG 161.00 IN

	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-1.689 2.233	42	1.20 -4.59	2.85 -5.96	3.78 -6.82	4.60 -7.66
HEAVE FT.	-0.650 0.390	37	-0.16 -1.14	0.12 -1.40	0.39 -1.53	0.51 -1.69
CG ACC G	-0.001 0.059	39	0.09 -0.08	0.12 -0.12	0.14 -0.14	0.17 -0.16

RUN 34

Deck Ht. 78 in

Water Jet 0 deg

SPEED 4.00 MPH
DRAG 1.19 KIP
LOAD 48.00 KIP

WAVE ENCOUNTERS 73
SIGNIFICANT WAVE HEIGHT 2.20 FT
LCG 167.00 IN

	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	2.887 3.840	79	7.62 -1.88	10.44 -4.24	11.85 -5.41	13.09 -6.12
HEAVE FT.	-0.130 0.434	67	0.36 -0.67	0.72 -1.03	0.94 -1.29	1.25 -1.49
CG ACC G	-0.002 0.056	73	0.08 -0.08	0.12 -0.12	0.14 -0.14	0.18 -0.18

TR - 2155

DAVIDSON LABORATORY

7-OCT-80

AMPHIBIOUS VEHICLE

RUN	35	Deck Ht. 78 in	Wave Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 52				
		DRAG 1.94 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 167.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.891	53	7.71	10.20	11.46	12.09
		3.723		-1.91	-4.23	-5.73	-7.24
HEAVE FT.		-0.206	46	0.37	0.76	0.99	1.27
		0.473		-0.78	-1.17	-1.42	-1.51
CG ACC G		-0.003	52	0.08	0.13	0.16	0.18
		0.065		-0.09	-0.14	-0.17	-0.19

RUN	36	Deck Ht. 78 in	Wave Jet 0 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 53				
		DRAG 2.71 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 167.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.667	52	6.66	9.23	10.64	13.41
		3.379		-1.55	-3.90	-5.59	-7.82
HEAVE FT.		-0.311	43	0.28	0.69	0.95	1.12
		0.481		-0.88	-1.28	-1.59	-2.21
CG ACC G		-0.001	47	0.09	0.14	0.19	0.22
		0.069		-0.10	-0.15	0.18	-0.21

TR - 2155

DAVIDSON LABORATORY

7-OCT-80

AMPHIBIOUS VEHICLE

RUN	37	Deck Ht. 78 in	Water Jet 0 deg			
	SPEED	7.00 MPH	WAVE ENCOUNTERS 43			
	DRAG	3.75 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT			
	LOAD	48.00 KIP	LCG 167.00 IN			
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	2.368	43	5.82	8.07	9.30	10.62
	2.783		-1.15	-2.92	-3.73	-4.81
HEAVE FT.	-0.469	37	0.10	0.44	0.61	0.66
	0.440		-1.03	-1.33	-1.57	-1.72
CG ACC G	-0.001	40	0.09	0.14	0.17	0.20
	0.068		-0.10	-0.15	-0.18	-0.19

RUN	38	Deck Ht 78 in	Water Jet 0 deg			
	SPEED	4.00 MPH	WAVE ENCOUNTERS 71			
	DRAG	1.12 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT			
	LOAD	48.00 KIP	LCG 155.00 IN			
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-1.374	72	2.59	4.81	6.12	8.63
	3.161		-5.44	-7.78	-9.31	-10.70
HEAVE FT.	-0.183	63	0.35	0.75	1.00	1.12
	0.449		-0.72	-1.05	-1.33	-1.59
CG ACC G	-0.002	65	0.08	0.12	0.15	0.19
	0.057		-0.08	-0.12	-0.15	-0.16

IR - 2155

DAVIDSON LABORATORY

8-OCT-80

AMPHIBIOUS VEHICLE

RUN 39

Deck Ht. 78 in

Water Jet 0 deg

SPEED 5.00 MPH
DRAG 1.78 KIP
LOAD 48.00 KIP

WAVE ENCOUNTERS 61
SIGNIFICANT WAVE HEIGHT 2.20 FT
LCG 155.00 IN

	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-1.955 2.823	56	1.56 -5.60	3.74 -7.86	5.40 -9.46	6.31 -11.02
HEAVE FT.	-0.284 0.458	52	0.24 -0.80	0.66 -1.21	0.91 -1.55	1.27 -1.97
CG ACC G	-0.006 0.061	51	0.08 -0.09	0.13 -0.14	0.16 -0.17	0.21 -0.21

RUN 40

Deck Ht. 78 in

Water Jet 0 deg

SPEED 6.00 MPH
DRAG 2.76 KIP
LOAD 48.00 KIP

WAVE ENCOUNTERS 50
SIGNIFICANT WAVE HEIGHT 2.20 FT
LCG 155.00 IN

	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-3.264 2.388	47	-0.26 -6.39	1.55 -8.04	2.69 -9.26	4.26 -11.21
HEAVE FT.	-0.515 0.434	41	0.04 -1.05	0.37 -1.40	0.56 -1.65	0.78 -2.23
CG ACC G	-0.005 0.060	42	0.08 -0.09	0.13 -0.13	0.17 -0.15	0.19 -0.19

TR - 2155

DAVIDSON LABORATORY

8-OCT-80

AMPHIBIOUS VEHICLE

RUN	43	Deck Ht. 78 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 60				
		DRAG 2.01 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 55.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-2.245	52	1.25	3.43	4.64	5.87
		2.646		-5.63	-7.59	-8.98	-10.33
HEAVE FT.		-0.395	46	0.12	0.45	0.77	1.13
		0.423		-0.91	-1.30	-1.61	-1.76
CG ACC G		-0.003	45	0.08	0.12	0.15	0.18
		0.052		-0.07	-0.11	-0.14	-0.18

RUN	45	Deck Ht. 78 in	Water Jet 0 deg				
		SPEED 4.00 MPH	WAVE ENCOUNTERS 69				
		DRAG 1.35 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 55.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		1.540	69	6.06	8.79	10.81	12.05
		3.634		-2.99	-5.66	-7.26	-10.01
HEAVE FT.		-0.190	59	0.32	0.68	0.90	1.30
		0.428		-0.72	-1.08	-1.43	-1.56
CG ACC G		-0.003	63	0.07	0.11	0.14	0.17
		0.051		-0.07	-0.11	-0.13	-0.19

TR - 2155

DAVIDSON LABORATORY

8-OCT-80

AMPHIBIOUS VEHICLE

RUN	41	Deck Ht. 78 in		Water Jet 0 deg		
		SPEED	4.00 MPH	WAVE ENCOUNTERS		70
		DRAG	1.30 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT
		LOAD	55.00 KIP	LCG		155.00 IN
		MEAN/RMS	OSC	AVG	1/3	1/10 EXTREME
PITCH DEG		-1.370	69	2.37	4.50	5.86 7.56
		2.949		-5.21	-7.19	-8.49 -9.79
HEAVE FT.		-0.243	59	0.27	0.62	0.77 0.92
		0.420		-0.77	-1.07	-1.28 -1.55
CG ACC G		-0.002	61	0.07	0.11	0.13 0.16
		0.050		-0.07	-0.11	-0.12 -0.16

RUN	42	Deck Ht. 78 in		Water Jet 0 deg		
		SPEED	5.00 MPH	WAVE ENCOUNTERS		60
		DRAG	2.01 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT
		LOAD	55.00 KIP	LCG		155.00 IN
		MEAN/RMS	OSC	AVG	1/3	1/10 EXTREME
PITCH DEG		-2.130	56	1.20	3.58	4.75 5.64
		2.692		-5.47	-7.50	-8.94 -11.07
HEAVE FT.		-0.389	46	0.12	0.48	0.75 1.00
		0.422		-0.90	-1.27	-1.54 -1.85
CG ACC G		-0.002	49	0.07	0.12	0.15 0.17
		0.052		-0.07	-0.11	-0.14 -0.18

IR - 2155

DAVIDSON LABORATORY

8-OCT-80

AMPHIBIOUS VEHICLE

RUN	46	Deck Ht. 78 in	Water Jet 0 deg			
	SPEED	5.00 MPH	WAVE ENCOUNTERS		56	
	DRAG	1.98 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	55.00 KIP			LCG 161.00 IN	
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	1.032	55	5.25	7.92	9.80	11.38
	3.376		-3.19	-5.82	-7.55	-9.56
HEAVE FT.	-0.286	49	0.25	0.63	0.94	1.39
	0.453		-0.82	-1.22	-1.61	-1.72
CG ACC G	-0.001	50	0.08	0.12	0.16	0.18
	0.056		-0.08	-0.12	-0.16	-0.21

RUN	47	Deck Ht. 78 in	Water Jet 0 deg			
	SPEED	4.00 MPH	WAVE ENCOUNTERS		70	
	DRAG	1.25 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	55.00 KIP			LCG 149.00 IN	
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-4.298	68	-1.20	0.52	1.49	2.23
	2.494		-7.44	-9.46	-10.56	-12.55
HEAVE FT.	-0.346	59	0.13	0.48	0.66	0.77
	0.408		-0.84	-1.19	-1.50	-1.68
CG ACC G	-0.003	60	0.07	0.10	0.13	0.15
	0.049		-0.07	-0.10	-0.13	-0.15

TR - 2155

DAVIDSON LABORATORY

8-OCT-80

AMPHIBIOUS VEHICLE

RUN	48	Deck Ht. 78 in		Water Jet 20 deg			
		SPEED	4.00 MPH	WAVE ENCOUNTERS		67	
		DRAG	1.26 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
		LOAD	55.00 KIP	LCG		149.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
FITCH DEG		-3.589	70	-0.29	1.69	3.12	4.12
		2.648		-6.82	-8.74	-10.00	-10.94
HEAVE FT.		-0.355	58	0.12	0.43	0.64	0.96
		0.397		-0.84	-1.18	-1.42	-1.61
CG ACC G		-0.003	58	0.07	0.10	0.13	0.15
		0.049		-0.07	-0.10	-0.13	-0.15

RUN	49	Deck Ht. 78 in		Water Jet 20 deg			
		SPEED	5.00 MPH	WAVE ENCOUNTERS		59	
		DRAG	1.96 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
		LOAD	55.00 KIP	LCG		155.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
FITCH DEG		-1.226	54	2.28	4.71	6.21	7.17
		2.973		-4.67	-7.18	-8.82	-10.16
HEAVE FT.		-0.439	47	0.08	0.43	0.70	0.88
		0.445		-0.94	-1.34	-1.69	-2.13
CG ACC G		-0.003	48	0.07	0.12	0.15	0.20
		0.058		-0.07	-0.11	-0.15	-0.17

TR - 2155

DAVIDSON LABORATORY

8-OCT-80

AMPHIBIOUS VEHICLE

RUN	51	Deck Ht. 78 in	Water Jet 20 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 60				
		DRAG 2.04 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 55.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		1.905	56	6.18	8.91	11.00	14.21
		3.505		-2.42	-5.20	-7.05	-8.65
HEAVE FT.		-0.360	46	0.23	0.61	0.87	1.30
		0.469		-0.93	-1.33	-1.65	-2.05
CG ACC G		-0.002	50	0.08	0.12	0.16	0.22
		0.056		-0.08	-0.13	-0.18	-0.19

RUN	52	Deck Ht. 78 in	Water Jet 20 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 51				
		DRAG 3.05 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 55.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.521	47	6.63	8.98	9.98	10.42
		3.231		-1.67	-3.61	-4.75	-6.05
HEAVE FT.		-0.503	42	0.02	0.37	0.52	0.72
		0.438		-1.04	-1.42	-1.62	-1.83
CG ACC G		-0.002	43	0.08	0.12	0.15	0.17
		0.058		-0.08	-0.12	-0.14	-0.18

TR - 2155

DAVIDSON LABORATORY

9-OCT-80

AMPHIBIOUS VEHICLE

RUN	53	Deck Ht. 78 in	Water Jet 20 deg				
		SPEED 7.00 MPH	WAVE ENCOUNTERS 46				
		DRAG 4.13 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		1.410	41	4.31	6.07	7.04	9.03
		2.353		-1.60	-3.29	-4.57	-7.28
HEAVE FT.		-0.738	37	-0.29	0.02	0.27	0.36
		0.397		-1.22	-1.56	-1.92	-2.36
CG ACC G		-0.004	40	0.07	0.11	0.14	0.18
		0.059		-0.08	-0.12	-0.15	-0.19

RUN	55	Deck Ht. 78 in	Water Jet 20 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 53				
		DRAG 2.94 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		1.579	46	5.43	7.64	9.26	10.65
		3.026		-2.25	-4.39	-5.93	-7.69
HEAVE FT.		-0.477	42	0.05	0.42	0.61	0.82
		0.448		-0.99	-1.41	-1.72	-2.35
CG ACC G		0.000	46	0.08	0.12	0.17	0.20
		0.058		-0.08	-0.12	-0.15	-0.18

TR - 2155

DAVIDSON LABORATORY

9-OCT-80

AMPHIBIOUS VEHICLE

RUN 56

Deck Ht. 78 in

Water Jet 20 deg

SPEED 7.00 MPH
DRAG 4.33 KIP
LOAD 48.00 KIP

WAVE ENCOUNTERS 47
SIGNIFICANT WAVE HEIGHT 2.20 FT
LCG 167.00 IN

	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	4.804 2.896	42	8.59 1.05	10.64 -0.70	11.51 -1.51	13.39 -2.36
HEAVE FT.	-0.625 0.415	38	-0.11 -1.14	0.22 -1.42	0.43 -1.61	0.51 -1.83
CG ACC G	-0.003 0.064	42	0.09 -0.10	0.12 -0.14	0.14 -0.17	0.19 -0.22

RUN 57

Deck Ht. 78 in

Water Jet 20 deg

SPEED 6.00 MPH
DRAG 3.14 KIP
LOAD 48.00 KIP

WAVE ENCOUNTERS 50
SIGNIFICANT WAVE HEIGHT 2.20 FT
LCG 167.00 IN

	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	4.253 3.519	47	8.66 -0.36	11.13 -2.61	12.66 -4.28	15.14 -6.79
HEAVE FT.	-0.434 0.457	40	0.14 -1.02	0.51 -1.37	0.79 -1.70	0.88 -2.24
CG ACC G	-0.004 0.063	48	0.08 -0.09	0.13 -0.14	0.17 -0.17	0.20 -0.20

TR - 2155

DAVIDSON LABORATORY

9-OCT-80

AMPHIBIOUS VEHICLE

RUN	58	Deck Ht. 78 in	Water Jet 20 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 51				
		DRAG 3.03 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.966	45	1.00	2.74	3.66	5.24
		2.348		-5.05	-6.62	-7.67	-10.50
HEAVE FT.		-0.662	41	-0.18	0.17	0.37	0.49
		0.399		-1.14	-1.46	-1.69	-2.17
CG ACC G		-0.002	39	0.07	0.11	0.14	0.17
		0.051		-0.07	-0.11	-0.13	-0.14

RUN	59	Deck Ht. 78 in.	Water Jet 20 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 60				
		DRAG 1.96 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.000	56	2.42	4.67	5.71	7.62
		2.827		-4.53	-6.84	-8.78	-11.10
HEAVE FT.		-0.394	47	0.15	0.55	0.70	0.88
		0.455		-0.93	-1.37	-1.75	-2.24
CG ACC G		-0.003	48	0.08	0.12	0.16	0.20
		0.053		-0.07	-0.12	-0.15	-0.17

TR - 2155

DAVIDSON LABORATORY

9-OCT-80

AMPHIBIOUS VEHICLE

RUN	60	Deck Ht. 78 in	Water Jet 20 deg			
	SPEED	6.00 MPH	WAVE ENCOUNTERS		54	
	DRAG	2.42 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	42.00 KIP	LCG 155.00 IN			
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-1.469	50	1.74	3.72	5.04	6.84
	2.631		-4.81	-6.73	-8.29	-10.89
HEAVE FT.	-0.450	43	0.13	0.50	0.72	0.86
	0.471		-1.02	-1.39	-1.72	-2.35
CG ACC G	-0.002	46	0.09	0.13	0.17	0.23
	0.065		-0.09	-0.13	-0.17	-0.21

RUN	61	Deck Ht. 78 in	Water Jet 0 deg			
	SPEED	5.00 MPH	WAVE ENCOUNTERS		63	
	DRAG	1.64 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	42.00 KIP	LCG 155.00 IN			
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-1.124	58	2.45	4.61	6.34	8.57
	2.896		-4.81	-7.12	-8.88	-10.83
HEAVE FT.	-0.293	53	0.22	0.64	0.93	1.40
	0.451		-0.81	-1.21	-1.56	-1.71
CG ACC G	-0.002	56	0.08	0.13	0.17	0.20
	0.060		-0.08	-0.13	-0.17	-0.23

IR - 2155

DAVIDSON LABORATORY

9-OCT-80

AMPHIBIOUS VEHICLE

RUN	62	Deck Ht. 78 in	Water Jet 20 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 62				
		DRAG 1.60 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 149.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-3.155	58	-0.09	1.84	3.19	4.59
		2.543		-6.39	-8.56	-10.09	-11.54
HEAVE FT.		-0.318	53	0.17	0.58	0.86	1.23
		0.437		-0.82	-1.22	-1.56	-1.80
CG ACC G		-0.003	54	0.08	0.12	0.16	0.20
		0.059		-0.08	-0.13	-0.17	-0.21

RUN	63	Deck Ht. 78 in	Water Jet 20 deg				
		SPEED 4.00 MPH	WAVE ENCOUNTERS 71				
		DRAG 1.07 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 149.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-2.760	72	1.03	2.85	4.28	5.95
		2.921		-6.55	-8.52	-9.73	-11.59
HEAVE FT.		-0.176	65	0.34	0.66	0.91	1.23
		0.438		-0.70	-1.04	-1.30	-1.50
CG ACC G		-0.002	67	0.08	0.11	0.15	0.19
		0.057		-0.08	-0.12	-0.14	-0.18

TR - 2155

DAVIDSON LABORATORY

9-OCT-80

AMPHIBIOUS VEHICLE

RUN	64	Deck Ht. 78 in	Water Jet 20 deg			
	SPEED	7.00 MPH	WAVE ENCOUNTERS		47	
	DRAG	3.53 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	42.00 KIP			LCG 161.00 IN	
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	1.000	42	4.62	6.50	7.29	9.10
	2.752		-2.63	-4.64	-5.85	-6.91
HEAVE FT.	-0.528	38	0.05	0.39	0.62	0.70
	0.446		-1.08	-1.40	-1.61	-1.82
CG ACC G	-0.002	40	0.09	0.14	0.17	0.21
	0.070		-0.10	-0.16	-0.19	-0.23

RUN	65	Deck Ht. 78 in	Water Jet 20 deg			
	SPEED	6.00 MPH	WAVE ENCOUNTERS		51	
	DRAG	2.47 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	42.00 KIP			LCG 161.00 IN	
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	1.110	53	5.02	7.70	9.20	11.29
	3.287		-2.79	-5.34	-7.10	-7.42
HEAVE FT.	-0.349	46	0.23	0.62	0.90	1.03
	0.492		-0.93	-1.35	-1.68	-2.15
CG ACC G	-0.002	48	0.10	0.15	0.20	0.22
	0.073		-0.10	-0.16	-0.20	-0.22

TR - 2155

DAVIDSON LABORATORY

9-OCT-80

AMPHIBIOUS VEHICLE

RUN	66	Deck Ht. 78 in	Water Jet 20 deg				
		SPEED 8.00 MPH	WAVE ENCOUNTERS 44				
		DRAG 4.82 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.672	38	3.64	5.33	6.05	6.18
		2.222		-2.21	-3.43	-3.93	-4.18
HEAVE FT.		-0.765	34	-0.26	0.08	0.29	0.38
		0.405		-1.27	-1.54	-1.65	-1.75
CG ACC G		-0.001	37	0.09	0.13	0.14	0.15
		0.064		-0.09	-0.13	-0.15	-0.15

RUN	67	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 61				
		DRAG 1.81 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 161.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		0.863	58	5.06	7.71	10.27	12.11
		3.376		-3.31	-5.91	-7.78	-9.88
HEAVE FT.		-0.208	51	0.34	0.76	1.04	1.45
		0.462		-0.75	-1.18	-1.48	-1.73
CG ACC G		-0.002	57	0.08	0.13	0.18	0.23
		0.062		-0.08	-0.14	-0.18	-0.24

TR - 2155

DAVIDSON LABORATORY

9-OCT-80

AMPHIBIOUS VEHICLE

RUN 68	Deck Ht. 84 in	Water Jet 0 deg				
	SPEED 6.00 MPH	WAVE ENCOUNTERS 53				
	DRAG 2.64 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
	LOAD 48.00 KIP	LCG 161.00 IN				
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	0.721	51	4.73	7.40	9.13	11.25
	3.336		-3.33	-5.93	-7.66	-9.95
HEAVE FT.	-0.327	43	0.28	0.71	1.01	1.32
	0.517		-0.95	-1.39	-1.71	-1.89
CG ACC G	-0.001	47	0.10	0.15	0.20	0.23
	0.072		-0.10	-0.16	-0.20	-0.26

RUN 69	Deck Ht. 84 in	Water Jet 0 deg				
	SPEED 7.00 MPH	WAVE ENCOUNTERS 49				
	DRAG 3.70 KIP	SIGNIFICANT WAVE HEIGHT .20 FT				
	LOAD 48.00 KIP	LCG 161.00 IN				
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	0.087	41	3.71	5.60	6.57	8.50
	2.745		-3.54	-5.48	-6.71	-8.11
HEAVE FT.	-0.487	37	0.09	0.43	0.69	0.86
	0.454		-1.07	-1.38	-1.64	-1.77
CG ACC G	-0.001	37	0.09	0.14	0.17	0.20
	0.068		-0.10	-0.15	-0.18	-0.22

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	71	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 8.00 MPH		WAVE ENCOUNTERS	45		
		DRAG 5.45 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 48.00 KIP			LCG 161.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-2.408	37	-0.15	1.35	2.09	2.68
		1.976		-4.79	-6.04	-6.91	-7.20
HEAVE FT.		-0.839	35	-0.41	-0.05	0.13	0.25
		0.376		-1.28	-1.55	-1.72	-1.92
CG ACC G		-0.002	37	0.07	0.11	0.13	0.17
		0.054		-0.07	-0.11	-0.12	-0.14

RUN	73	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 6.00 MPH		WAVE ENCOUNTERS	48		
		DRAG 2.85 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 48.00 KIP			LCG 167.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.920	51	7.26	9.94	12.29	14.06
		3.549		-1.52	-3.98	-5.58	-7.56
HEAVE FT.		-0.259	44	0.33	0.73	1.02	1.42
		0.487		-0.84	-1.24	-1.59	-2.08
CG ACC G		-0.001	52	0.09	0.14	0.19	0.23
		0.071		-0.10	-0.15	-0.19	-0.25

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	74	Deck Ht. 84 in	Water Jet	0 deg			
		SPEED 7.00 MPH		WAVE ENCOUNTERS	47		
		DRAW 3.87 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 48.00 KIP		LCG	167.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.641	43	6.73	8.67	9.75	11.77
		3.152		-1.43	-3.43	-4.76	-6.51
HEAVE FT.		-0.410	39	0.17	0.53	0.77	0.96
		0.463		-0.98	-1.33	-1.56	-1.69
CG ACC G		-0.001	46	0.10	0.15	0.18	0.20
		0.074		-0.10	-0.15	-0.19	-0.25

RUN	75	Deck Ht. 84 in	Water Jet	0 deg			
		SPEED 8.00 MPH		WAVE ENCOUNTERS	42		
		DRAW 5.05 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 48.00 KIP		LCG	167.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		2.536	40	5.76	7.46	8.37	9.16
		2.626		-0.87	-2.60	-3.63	-4.51
HEAVE FT.		-0.572	38	-0.05	0.29	0.48	0.57
		0.443		-1.09	-1.44	-1.69	-1.86
CG ACC G		-0.001	40	0.09	0.14	0.17	0.20
		0.074		-0.10	-0.15	-0.17	-0.18

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	76	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 61				
		DRAG 1.75 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 1 .00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.318	58	2.49	5.05	7.01	8.43
		3.080		-5.17	-7.60	-9.34	-11.32
HEAVE FT.		-0.237	53	0.29	0.72	1.01	1.40
		0.460		-0.75	-1.17	-1.55	-1.81
CG ACC G		-0.002	52	0.08	0.13	0.18	0.22
		0.062		-0.08	-0.13	-0.17	-0.22

RUN	77	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 52				
		DRAG 2.52 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 48.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-1.943	46	1.56	3.47	4.56	6.10
		2.734		-5.55	-7.52	-9.33	-10.19
HEAVE FT.		-0.381	42	0.19	0.57	0.80	1.03
		0.466		-0.95	-1.36	-1.64	-2.12
CG ACC G		-0.001	44	0.09	0.14	0.18	0.20
		0.065		-0.09	-0.14	-0.16	-0.20

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	78	Deck Ht. 84 in	Water Jet 0 deg			
	SPEED	7.00 MPH	WAVE ENCOUNTERS		43	
	DRAW	3.82 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	48.00 KIP			LCG 155.00 IN	
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-3.581	42	-0.83	0.41	1.03	1.62
	2.106		-6.38	-7.85	-8.52	-9.39
HEAVE FT.	-0.670	39	-0.16	0.11	0.26	0.40
	0.406		-1.18	-1.44	-1.57	-1.67
CG ACC G	-0.004	38	0.08	0.11	0.13	0.14
	0.057		-0.08	-0.11	-0.12	-0.14

RUN	79	Deck Ht. 84 in	Water Jet 0 deg			
	SPEED	5.00 MPH	WAVE ENCOUNTERS		63	
	DRAW	1.91 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	55.00 KIP			LCG 155.00 IN	
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	-1.324	54	2.65	5.28	6.55	8.38
	3.077		-5.17	-7.58	-9.50	-11.19
HEAVE FT.	-0.288	49	0.25	0.66	0.98	1.40
	0.464		-0.84	-1.25	-1.68	-1.91
CG ACC G	-0.002	50	0.08	0.13	0.18	0.21
	0.058		-0.08	-0.12	-0.16	-0.20

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	80	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 4.00 MPH	WAVE ENCOUNTERS 70				
		DRAG 1.31 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 55.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-0.947	69	3.42	5.80	7.44	9.30
		3.394		-5.32	-7.69	-9.15	-11.31
HEAVE FT.		-0.164	61	0.38	0.74	0.96	1.27
		0.452		-0.72	-1.09	-1.37	-1.55
CG ACC G		-0.002	61	0.08	0.12	0.15	0.18
		0.055		-0.08	-0.11	-0.14	-0.19

RUN	81	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 49				
		DRAG 2.81 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 55.00 KIP	LCG 155.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-2.123	47	1.18	3.22	4.33	5.75
		2.648		-5.50	-7.45	-9.18	-11.24
HEAVE FT.		-0.431	44	0.06	0.43	0.65	0.70
		0.430		-0.92	-1.33	-1.66	-2.20
CG ACC G		-0.002	43	0.08	0.13	0.16	0.19
		0.058		-0.08	-0.12	-0.14	-0.15

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	82	Deck Ht. 84 in	Water Jet 0 deg			
	SPEED	4.00 MPH	WAVE ENCOUNTERS		66	
	DRAG	1.36 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	55.00 KIP			LCG 161.00 IN	
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	1.493	71	6.36	9.24	10.85	13.30
	3.862		-3.39	-5.90	-7.27	-10.48
HEAVE FT.	-0.156	61	0.38	0.73	0.93	1.23
	0.438		-0.69	-1.04	-1.33	-1.48
CG ACC G	-0.002	66	0.07	0.11	0.15	0.17
	0.053		-0.08	-0.11	-0.14	-0.20

RUN	84	Deck Ht. 84 in	Water Jet 0 deg			
	SPEED	5.00 MPH	WAVE ENCOUNTERS		62	
	DRAG	1.94 KIP	SIGNIFICANT WAVE HEIGHT		2.20 FT	
	LOAD	55.00 KIP			LCG 161.00 IN	
	MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG	1.417	58	5.81	8.69	10.55	12.57
	3.585		-2.95	-5.67	-7.44	-9.11
HEAVE FT.	-0.235	50	0.28	0.65	0.94	1.32
	0.437		-0.76	-1.12	-1.41	-1.76
CG ACC G	-0.002	54	0.08	0.12	0.16	0.21
	0.058		-0.08	-0.12	-0.16	-0.19

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	85	Deck Ht. 84 in	Water Jet	0 deg		
		SPEED 6.00 MPH		WAVE ENCOUNTERS	54	
		DRAG 2.78 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT	
		LOAD 55.00 KIP		LCG	161.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10
PITCH DEG		0.967	46	5.17	7.40	8.50
		3.227		-3.32	-5.44	-6.99
HEAVE FT.		-0.343	44	0.21	0.62	0.84
		0.463		-0.88	-1.28	-1.54
CG ACC G		-0.002	45	0.08	0.13	0.16
		0.063		-0.09	-0.13	-0.16

RUN	86	Deck Ht. 84 in	Water Jet	0 deg		
		SPEED 7.00 MPH		WAVE ENCOUNTERS	44	
		DRAG 4.00 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT	
		LOAD 55.00 KIP		LCG	161.00 IN	
		MEAN/RMS	OSC	AVG	1/3	1/10
PITCH DEG		0.155	41	3.76	5.54	6.48
		2.743		-3.42	-4.96	-5.88
HEAVE FT.		-0.526	37	0.01	0.32	0.55
		0.430		-1.07	-1.35	-1.52
CG ACC G		-0.001	39	0.09	0.13	0.15
		0.062		-0.09	-0.12	-0.15

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	87	Deck Ht. 84 in	Water Jet	0 deg			
		SPEED 4.00 MPH		WAVE ENCOUNTERS	72		
		DRAG 1.17 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 55.00 KIP			LCG 149.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-3.137	69	0.39	2.46	3.69	6.01
		2.852		-6.82	-9.04	-10.63	-12.06
HEAVE FT.		-0.209	61	0.31	0.67	0.93	1.05
		0.435		-0.73	-1.09	-1.37	-1.58
CG ACC G		-0.002	62	0.07	0.11	0.14	0.19
		0.053		-0.07	-0.11	-0.14	-0.19

RUN	88	Deck Ht. 84 in	Water Jet	0 deg			
		SPEED 5.00 MPH		WAVE ENCOUNTERS	59		
		DRAG 1.82 KIP		SIGNIFICANT WAVE HEIGHT	2.20 FT		
		LOAD 55.00 KIP			LCG 149.00 IN		
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-3.767	54	-0.62	1.42	2.45	3.78
		2.524		-7.00	-9.11	-10.77	-11.96
HEAVE FT.		-0.356	47	0.14	0.51	0.82	1.18
		0.416		-0.85	-1.24	-1.57	-1.69
CG ACC G		-0.003	46	0.07	0.12	0.15	0.18
		0.053		-0.08	-0.12	-0.15	-0.18

TR - 2155

DAVIDSON LABORATORY

10-OCT-80

AMPHIBIOUS VEHICLE

RUN	89	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 5.00 MPH	WAVE ENCOUNTERS 61				
		DRAG 1.51 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 149.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-3.292	61	0.09	2.24	3.59	6.35
		2.757		-6.62	-8.78	-10.74	-12.48
HEAVE FT.		-0.246	51	0.30	0.72	1.06	1.52
		0.479		-0.81	-1.27	-1.62	-1.80
CG ACC G		-0.003	56	0.08	0.13	0.18	0.20
		0.064		-0.09	-0.14	-0.18	-0.24

RUN	90	Deck Ht. 84 in	Water Jet 0 deg				
		SPEED 6.00 MPH	WAVE ENCOUNTERS 54				
		DRAG 2.24 KIP	SIGNIFICANT WAVE HEIGHT 2.20 FT				
		LOAD 42.00 KIP	LCG 149.00 IN				
		MEAN/RMS	OSC	AVG	1/3	1/10	EXTREME
PITCH DEG		-3.997	50	-1.03	0.71	1.64	2.63
		2.460		-7.06	-9.01	-11.19	-11.96
HEAVE FT.		-0.384	42	0.18	0.56	0.76	0.96
		0.462		-0.95	-1.36	-1.66	-2.17
CG ACC G		-0.003	45	0.09	0.14	0.18	0.21
		0.065		-0.09	-0.14	-0.17	-0.21

R-2155

DISTRIBUTION LIST
(Contract N00014-80-D-0890)

Copies

20	DAVID W. TAYLOR NAVAL SHIP R & D CENTER Bethesda, MD 20084 Attn: Code 1120
1	OFFICE OF NAVAL RESEARCH 800 N. Quincy Arlington, VA 22217 Attn: Code 438
1	OFFICE OF NAVAL RESEARCH Branch Office Building 114, Section D 666 Summer Street Boston, MA 02210
1	OFFICE OF NAVAL RESEARCH Resident Representative 715 Broadway, 5th Floor New York, NY 10003
1	NAVAL RESEARCH LABORATORY Washington, DC 20375 Attn: Code 2627
12	DEFENSE TECHNICAL INFORMATION CENTER Building 5, Cameron Station Alexandria, VA 22314
1	FMC CORPORATION Defense Equipment Group 727 - 23rd Street, South Box 2708 Arlington, VA 22202

LMED
-8-